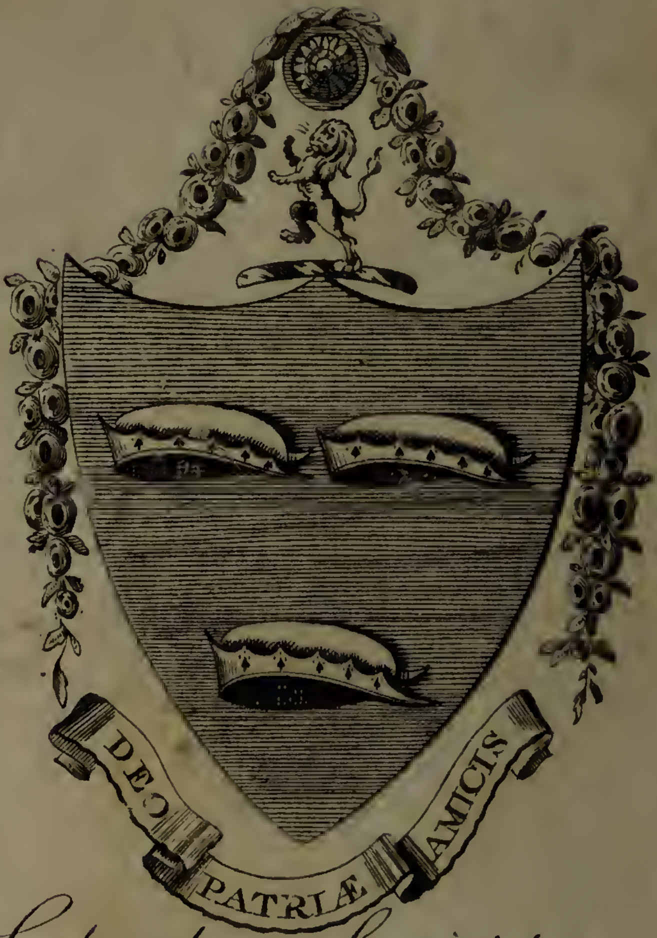
2/



Charles Lutwidge,
Holm Rook.

Book plate of Charles Lutwidge
underneath (cf. [illegible])

Hon^{ble}

Hugh Percy

Lifted Nov. 1989

87447

AN ESSAY TOWARDS A Natural Hiſtory OF WESTMORLAND AND CUMBERLAND.

WHEREIN

An Account is given of their ſeveral Mineral and Surface Productions, with ſome Directions how to diſcover Minerals by the External and Adjacent *Strata* and Upper Covers, *&c.*

To which is Annexed,

A Vindication of the *Philoſophical* and *Theological* PARAPHRASE of the *Moſaick* Syſtem of the *Creation*, &c.

By *THO. ROBINSON*, Rector of *Ousby* in *Cumberland*.

LONDON: Printed by *J. L.* for W. FREEMAN, at the *Bible* againſt the *Middle-Temple-Gate* in *Fleetſtreet*, 1709.

WELLCOME HISTORICAL MEDICAL LIBRARY

TO THE

RIGHT HONOURABLE

RICHARD,

Lord Viſcount *Lonſdale*,

Baron *Lowther* of *Lowther*.

MY LORD,

THE many Favours I receiv'd from my late good Lord, Your Lordſhip's Father, have given me Encouragement to Addreſs this ſmall Treatiſe to Your Honour, wherein Your Lordſhip will have an Account of ſuch Obſervations as I have made of the Mineral Productions of the two Northern Counties of *Cumberland* and *Weſtmorland*, with ſome Natural and Philoſophical Reflections upon them, Grounded upon a general, yet very probable, if not Evident *Hypotheſis*: (Viz.) *That when the Almighty by the firſt Diviſion of the Waters made the dry Land to appear, all the Lax and floating Particles of Matter, in that vaſt and confuſed Maſs, which were of the ſame Nature and Affinity, by an agreeable Juxta-poſition of Parts, and a ſecret Magnetiſm, drew together and did fix and ſettle into particular Claſſes, every Claſs producing ſome Mine, Metallick Ore, or Mineral, which is the more Pneumatick Part and Perfection of that Claſs*: I have therefore upon this Topick divided theſe two Counties into ſeveral Claſſes, and given an Account of ſuch Mineral Productions as are peculiar to every Claſs of a Mineral Nature: And have likewiſe given ſome Directions how to diſcover the ſeveral kinds of Minerals by the external and adjacent *Strata* or Upper Covers; as we diſcover Nuts or other Fruits by their Husks, Shells, or outward Coats.

My Lord, My only Deſign in this Treatiſe is, to give Caution to ſuch Gentlemen as have a Mineral Spirit, that they may not be impoſed on by ſuch Ignorant Pretenders as go about taking Advantage of the Credulity of Gentlemen, Cheating them out of their Money.

My Lord, I will forbear in this Addreſs to make the World acquainted with thoſe vaſt Improvements Your Lordſhip has made in all thoſe Noble and Liberal Sciences, Divine and Humane, which Exalt and Sublime our Nature, and in a great Meaſure recover that Divine Image after which we were at firſt made, in Conformity to which all ſound Religion and true Nobility conſiſt.

My Lord, That which ſets off Your Honour's Improvements with more Advantage, is, That they are made ſo Early in your blooming Years, whilſt Your Lordſhip is yet under, the Tuition of the Right Honourable Your Lady Mother, and ſuch Learned and Ingenious Tutors, as her Pious and Prudent Care hath made choice of for the Improvement of your growing Years.

But, *My Lord*, 'Tis not only Your Honour's acquired Accompliſhments, but thoſe Natural Endowments, that Charming Sweetneſs of Temper, thoſe Agreeable Condeſcenſions (not at all derogatory to Your Lordſhip's high Birth and Quality) which are the diſtinguiſhing Graces the Author of Nature hath particularly Bleſſed you with, and by which Your Lordſhip hath made a Conqueſt over the Hearts of all that have had the Honour and Happineſs of your ſweeter Converſation, which have Encouraged my Preſumption to preſent to Your Honour this ſhort *Eſſay*, in which, if there be any thing that may Inform your Judgment in theſe Subterranean Matters; or upon Occaſion of your Surveying thoſe many and large Mannors Your Lordſhip is the happy Proprietor of, may be ſerviceable to Your Lordſhip, I ſhall value my ſelf thereupon.

Oratory was never my Talent, and therefore I am not qualified to give the World a juſt Encomium of Your Lordſhip's preſent Merits and promiſing Years, which offer us ſo near a Proſpect of that great Bleſſing, which not only theſe two Counties, but the whole Kingdom will Enjoy in Your Lordſhip's Riper and more mature Age; but my want of proper Expreſſions ſhall be ſupply'd with the Sincerity of my hearty Prayers for the Increaſe of Your Lordſhip's Honour and Happineſs in this Life, and Glory Eternal in the Life to come. *I am,*

My Lord,

Your Lordſhip's moſt Faithful

and Obedient Servant,

Tho. Robinson.

THE

PREFACE.

IT was never my Ambition to be in Print, but having been Reflected upon by ſome, who value themſelves upon the Glittering Title of Virtuoſi, *and have undertaken to entertain the World with new* Schemes *and* Theories *of this Earth, without ever being Ten Foot under Ground, I muſt take leave to tell theſe learned Gentlemen, That it's Morally impoſſible for them to come to any certain Knowledge of the Natural Conſiſtencies of this* Earth, *the Poſition of the ſeveral* Strata, *and Sediments on which*

which its Fabrick is Built; *the Nature of* Veins, Mines, *and* Minerals; *the Circulation of Subterrene Waters, from whence all* Springs *and* Rivers *have their* Riſe; *unleſs from the uncertain Reports of* Miners, *who ſometimes go about the Country like* Mountebanks, *pretending to what they know no more of than Children in the* Horn-Book *know of Metaphyſicks, or Mathematicks.*

I eaſily foreſee, that this Freedom will give Offence to ſome Men, who expect to be treated with a more agreeable Ceremony; *but unleſs they can ſupport and fortify their New* Theories *with Arguments more agreeable to the Scripture, Reaſon, and the Experience of ſuch Judicious* Miners, *as have made it their Buſineſs to Obſerve the ſeveral* Natures *of theſe Subterranean* Compoſitions, *I could wiſh, that by all means they would ſmother their Reſentments.*

But it's not my Deſign, to Reflect upon the particular Character of any Ingenious Pretender, *but to Support and Vindicate my own* Character, *as a Clergy-Man, as well as my Judgment in* Minerals, *having been now Thirty Years concerned in the Inſpection of Under-ground Projects of ſeveral* Kinds *and* Natures.

And if ſuch Ocular *Obſervations as I have made, prove of Benefit and Uſe to Mankind, but more eſpecially to my Country-Men, I ſhall Value my ſelf thereupon.*

For having received not only Common Reſpect and Civilities from moſt of the Gentry in theſe two Counties, but from ſeveral many ſingular Favours, for which

I thought that a bare Acknowledgment would be too thin and airy a Return; I therefore preſent them with this ſmall Treatiſe, *as a more ſolid and ſubſtantial Teſtimony of my Gratitude and Thankfulneſs.*

THE CONTENTS OF THE FIRST PART.

THE *Introduction*, Page 1.

CHAP. I.

Of Mountains in general, with their Natural Uſes, in reference to the whole Earth, p. 3.

CHAP. II.

Of Heat and Cold; their natural Uſes and different Operations, but eſpecially of their attractive Powers, p. 10.

CHAP.

CHAP. III.

Of the Earth *in general, with the different Natures of* Soils, *and* Virgin Earth, *with their Natural Productions,* p. 17.

CHAP. IV.

Of Water *in general, ſhewing the Original of* Springs, Rivers, Lakes, Ponds, Mineral Waters, *&c.* p. 23.

CHAP. V.

Of Stones *in general, their different* Natures, Forms, *and* caſual Impreſſions, *&c.* p. 26.

CHAP. VI.

Of the different Claſſes *of* Matter *of the* Earth, *with their Natural Productions; but more eſpecially of the different* Claſſes *of theſe two Counties,* &c. p. 34.

CHAP. VII.

Of the Eaſt Claſs, *with its Mineral Productions,* &c. p. 35.

CHAP. VIII.

Of the Second Claſs, *bounded by* Eden *on the* Eaſt, *and* Pettorel *on the* Weſt, *with its* Mineral *Productions,* p. 48.

CHAP. IX.

Of the Third Claſs, *with its* Mineral *Productions,* &c. p. 54.

CHAP. X.

Of the Fourth Claſs, *or the* Weſtern Mountains, *their* Mineral Productions, *with an Account of the ſeveral* Lakes *and* Ponds, *and the River* Darwent, *with the kinds of Fiſh they breed,* &c. p. 57.

CHAP. XI.

Of the Art of Calcining *and* Refining *ſuch* ſulphurous Copper Ores, *as are got in the* Mountains *about* Keſwick *and* Newlands, *ſo that the Sulphur does not burn and deſtroy the* Metal, p. 64.

CONTENTS.

CHAP. XII.

Of the Generation, Growth, *and* Tranſmutation *of* Metals, *&c.* p. 67.

CHAP. XIII.

Of Mundick Metals, *but more eſpecially of* Black-*Lead, or* Wadd; *its Nature and Uſes*, &c. p. 74.

CHAP. XIV.

How to diſcover Mines *of* Coal, Veins *of* Copper, Lead, Iron, *&c. by their Upper Covers and adjoining* Strata, *as we diſcover* Nuts, *and other Fruits by their* Husks, Shells, Leaves, *and outer* Coats, p. 77.

CHAP. XV.

Whether there be Precious Stones, *or* Stones *of a* conſiderable *Value, to be found in theſe two Counties*, p. 83.

AN

AN ESSAY TOWARDS A Natural Hiſtory OF *Weſtmorland* and *Cumberland.*

The INTRODUCTION.

THESE two Counties are ſituated in the Northern part of *England*, and in the Center or middle of the Iſland of *Great Britain.* Their Surface is elevated above the reſt of the Iſland; which expoſeth the Inhabitants to a colder, yet a more healthful Air than the level Counties:

They conſiſt of Mountains, Hills, Dales, and Vallies; and theſe Elevations, and Depreſſions of their Surface, occaſion great difference in the Soil, producing great variety of *Herbs*, *Plants*, and *Vegetables*; which afford not only wholſome Food and Nouriſhment, for vaſt Stocks of Sheep feeding upon the Mountains, but for numerous Herds of Beaſts and Cattle in the Dales and Vallies, which are not only checker'd with natural *Groves* of Wood, compoſed of ſeveral ſorts of Trees, as the *Oak*, *Aſh*, *Birch*, &c. fit for Timber, and other Uſes; but alſo interlaced with rapid Rivulets flowing from the Mountains.

In theſe two Counties we alſo have ſeveral *Parks* and *Foreſts*, well ſtocked with Deer, both *Red* and *Fallow*, which, in their Seaſon, are as fat and well grown, as any perhaps in the whole Iſland.

The Interior *Strata* of theſe Mountains and Hills are no leſs productive of ſeveral kinds of metallick *Ores*, *Mines*, *Minerals*, and *Semi-minerals*, which may enrich the ingenious and induſtrious Miner; of all which, the following Chapters will give a more particular Account. But, Seeing all *Countries*, and particular *Situations*, are eſteemed more or leſs pleaſant, according to the different degrees of Heat and Cold, the Fertility and Sterility of the natural Soil, the conveniencies of *Stones*, *Water*, and *Fuel*; That this *Natural Hiſtory* may be more uſeful, compleat, and ſatisfactory to the Reader, we ſhall firſt Treat of *Mountains*, *Earths*, *Waters*, and the *Operations* of *Heat* and *Cold*, in general, as neceſſary Preliminaries, before we make our particular Obſervations upon thoſe ſeveral Claſſes and Diviſions, into which, for Method and Diſtinction ſake, we have divided theſe two Counties.

CHAP. I.

Of Mountains in general, with their Natural Uſes, in reference to the whole Earth.

SOME of our late *Theoriſts*, who have undertaken to give us ſome new Schemes and Deſcriptions of this Terraqueous Globe, and to entertain us with Theories of it, ſeem to be of Opinion, that the *Antidiluvian* Earth was mathematically round, without Mountains, Hills, or Vallies, as if theſe exuberances of its Surface, like Warts and Wens, were the Deformities of it. But this *Hypotheſis*, or rather Conceit, ſeems to be the effect of their Ignorance in Divinity, as well as Natural Philoſophy. For if theſe new *Theoriſts* had conſidered that God hath made nothing in the whole Creation in vain, but to wiſe Ends, and the beſt of Purpoſes, tho' the narrowneſs of our dark Intellect is not able fully to comprehend them, they would have been convinced of their Miſtake, and retracted their ill grounded *Hypotheſis*. For as God was pleaſed to make, not only the Earth it ſelf, but all the ſeveral Ranks and Species of Creatures which live upon it, and are ſubordinate to our Nature, for our Uſe, Pleaſure, and Diverſion; ſo theſe high and lofty Mountains, do not only contribute to the Entertainment of our viſive Faculty, with moſt curious and delightful Landskips, but preſent us with a Set of Vegetables peculiar to their cold and elevated Soil, and moſt proper and agreeable with the hot Natures of Sheep and other Creatures bred upon them, which are moſt refreſhed with the coldneſs and frigidity of the Mountain-Air. But as the whole Frame and Fabrick of the World is ſupported and preſerved in order by the Agreement, Conſpiracy, and Subſerviency of one Part to another; ſo one Part of the Earth is ſerviceable to another, and the

Mountains to the Whole: For I cannot yet underſtand how this Earth could have been an habitable World, without a diſtribution of Rain, Wind, Air, and Dews; for all which thoſe *warm* and *ſpatious Plains* and *Vallies* are in a great meaſure indebted to the high and lofty Tops of Mountains, that ſeem with Pride and Contempt ſo much to overlook them.

This dark *Phænomenon* in *Nature* will be made more apparent, and obvious, if we make an Inquiry into the Original of *Wind*, *Rain*, and *Storms*, and how theſe are diſtributed over the Surface of the *Earth*.

Some Philoſophers have been in buſy queſt to find out the Original of Wind and Rain; and after much ſweat, ſeem to diſcover Wind to riſe out of the *Hollows* and *Cavities* of Rocks and Mountains; and that the *Rain* that waters the Surface of the Earth, ariſeth from Rivers, Lakes, Ponds, and wateriſh Earth.

I confeſs, that *Wind* blows from the Mountains, and that ſome Rain ariſeth from Rivers, Lakes, Ponds, and wateriſh Earth: But this Wind and Rain are only at ſecond hand, and are not ſufficient ſo to moiſten and water the Earth's Surface, as to make it prolifick and fertile.

We muſt therefore endeavour to find out the Original Cauſe of both, and then we ſhall preſently find by what means their diſtribution is made over the Earth; and ſince neither the Rivers, Ponds, Lakes, nor wateriſh Earth can implete the Atmoſphere with ſuch a conſtant Supply of Wind, Air, and Rain, as is ſufficient to anſwer the ends of Nature, we muſt take it for granted, that the Sea, or Main Ocean, is the grand *Storehouſe* which ſupplies the Atmoſphere with Wind to bruſh and cleanſe the Air; without which, it would preſently ſtagnate and corrupt; and likewiſe with Rains to moiſten the dry and over-heated Air, and fertilize the Earth. We are indeed told by our *Lord* that the *Wind* blows where it liſteth, and that no Man knows from whence it cometh, or whether it goeth; and therefore to enquire from whence it derives its Original, ſeems to be a Boldneſs unbecoming a Diſciple of Chriſt. But as God Almighty hath made us reaſonable Creatures, he has given us alſo Power and Authority to exerciſe thoſe rational Faculties he hath given us. And we cannot make a better Improvement of this our eſſential, and diſtinguiſhing Talent, than by ſearching into the Book of *Nature*, wherein we may read the lively and moſt glorious Characters of the Divine Eſſence, and thoſe Eſſential Attributes of his Almighty Power and Infinite Wiſdom: And when we behold and conſider this wonderful Fabrick, this magnificent Palace, wherein we live, the Symmetry and Proportion, the Agreeableneſs and Conſpiracy of its Parts, and how one Thing ſerves another, we cannot but adore the Almighty and Wiſe Architect, and the great Rector of the Univerſe. *He that is wiſe, and well conſidereth theſe things,* ſaith the Pſalmiſt, *he ſhall praiſe the Lord for his goodneſs, and declare the wonders that he hath done for the Children of Men.*

But to return to the Subject in hand; becauſe Wind is the uſual fore-runner of Rain, and the diſtributer of it over the Earth, we ſhall make it our firſt endeavour to find out its original, as well as its natural Uſes; and notwithſtanding the difficulty of the Diſcovery, we may venture to aſſert, That in the greateſt probability, it proceeds from vaſt ſwarms of *nitrous* Particles, ariſing from the bottom of the *Sea*; which being put into Motion, either by the central *Fire*, or by that *Heat* and Fermentation which abound in this great Body of the Earth: And therefore this firſt Commotion, excited by the ſaid Fermentation, we call a *Bottom Wind*, which is preſently diſcovered by *Porpices*, and other Sea-Fiſh, which delight to ſport and play upon the Waves of the Sea; who, by their playing, give the *Mariners* the firſt Notice of an approaching Storm: When theſe *nitrous* ſwarms are riſen toward the Surface of the Sea, in a dark Night, they cauſe ſuch a ſhining Light upon the Waves, as if the Sea were on fire; and being delivered from the brackiſh Water, and received into the open Air, thoſe fiery and ſhining Meteors which fix upon the Maſts and ſides of Ships, and are only *nitrous* Particles condenſed by the circumambient Cold, and like that which the Chymiſts call *Phoſphorus*, or Gloe-Worm, ſhine and caſt a Light, but have no *Heat:* This gives to *Mariners* the ſecond Notice, that the Storm is riſing; for upon the firſt breaking out of the Wind, the Sea begins to be rough, the Waves ſwell and riſe, when at the ſame time the Air is calm and clear.

This boiling Fermentation of the Sea cauſeth the Vapours to ariſe, which by the Intenſeneſs of the circumambient Cold, is condenſed into thick Clouds, and falls down in Storms of Wind and Rain, firſt upon the Sea from whence they roſe, and then the attractive Power of the Mountain-Cold, by a ſecret Magnetiſm, between Vapour and Cold, attracts the wateriſh Vapours, intermix'd with *nitrous* Particles, to the high Tops of Mountains and Hills, where they hang hovering in thick Fogs and wateriſh Miſts, until the *Atmoſpherial Heat* rarifies the *nitrous* part of the Fog, which is always uppermoſt, and appears white and *tranſlucent*, into briſk Gales of Wind, and the Intenſeneſs of *Atmoſpherial Cold*, having attracted the Vapours into the colder Regions of the *Air*, where, being condenſed into Clouds, the Wind breaks, diſſipates, and drives them before it until they fall down in Rain, and water the Surface of the Earth; and this ſeems to be the reaſon why, in *Egypt*, and thoſe level Countries where they have no Mountains, they have little Wind, and leſs Rain.

Again, God hath ſo ordered it, that all the great Rivers upon the Earth ſhould have their Riſe, and break out from the tops and ſides of the higheſt Mountains; whoſe declivities give them both Weight and Motion, which preſſing into the Sea, cauſeth that conſtant Flux and Reflux, which is ſo neceſſary for Navigation. For that Reciprocation of Motion, is occaſioned by a continual ſtrife between the freſh and ſalt Water; when the weight of the ſalt Water forceth back the freſh *River* Water, it cauſeth a *Flux*; and when, on the other ſide, the *River* Water forceth back the ſalt Water, it cauſeth a *Reflux*; and the reaſon why in ſome parts of the *Mediterranean* Sea, there is neither Flux nor Reflux, is, that the River *Nilus* and * *Niger*, by their long Courſes through thoſe level Countries of *Egypt*, &c. have loſt both their Weight and Rapidity; yet, I am of Opinion,

* *The Pacifick Sea*, &c.

nion, that theſe ſlow running Rivers do gradually ſwell up the Sea into ſuch a gibboſity, as contributes to that annual Flux, or overflowing of *Nilus*, &c.

There are ſeveral other Advantages which the level Countries, eſpecially the Dales and Vallies, receive from the Mountains, which I ſhall give Account of when I come to treat of the Mountains we have in theſe two Counties.

CHAP. II.

Of Heat and Cold; their natural Uſes and different Operations, but eſpecially of their attractive Powers.

IT was an excellent Obſervation made by the Lord *Bacon*, that great Maſter of Natural Philoſophy, That *Heat* and *Cold* were the two Hands of *Nature*, which does not only, by Turns and Interchanges, govern the Atmoſpherial *Regions*: But all thoſe Mineral Productions, in the dark Kingdom of the Earth, are effected by the Operations of *Heat*, imbodied in *Sulphur*; and *Cold*, imbodied in *Quickſilver*; and theſe Two are reputed the Male and Female Parents of all Mineral Productions: And it's very probable that all ſpiritual *Entities*, whether animate or inanimate, do act in material Vehicles ſuitable and agreeable with their Natures.

We generally ſpeak well of *Heat*, becauſe of the Benefits we receive from its warm and enlivening Influence upon us; but as ſlightly and indifferently of Cold; as if it were an Enemy to *Mankind*, and not uſeful in Nature. And therefore ſome of our young Philoſophers have excluded it out of all the *Categories*, making it only a Privation of Heat, and a *Non Ens* in Nature. But if theſe young Philoſophers would take a Journey to *Greenland*, *Freezland*, or ſome of thoſe cold and freezing Countries, they would there meet with the Effects of Cold, when it crops their Ears, mortifies their Fingers, and perhaps deprives them of the Badge of their Sex.

Beſides, we do obſerve that *Cold* does as readily pervade the ſtrait Pores of any Veſſel of Wood, Stone, Glaſs, *&c.* as its oppoſite *Heat*; and we yet further obſerve, that what *Heat* diſſolves, as Wax, Metals, *&c.* that *Cold* hardens; and on the contrary, what *Cold* hardens, that *Heat* diſſolves. By which it's apparent, that *Cold* is not only ſomething in Nature, but as uſeful as its oppoſite, *Heat*.

And therefore the generality of *Natural* Philoſophers have been very inquiſitive to find out the *Primum Frigidum* in *Nature.* Some contend for the Earth; others for the *Water*; a third for the *Air*; a fourth for *nitrous Steams*; a fifth for the *Wind:* Theſe different Hypotheſes are in my Opinion not deſerving of a particular Refutation. For as God hath made the Sun a Central Heat, and the *Primum Calidum*, ſo it's very probable and agreeable with reaſon, that the *Moon*, our next Neighbouring Globe, was made by the Divine Wiſdom, the *Primum Frigidum*; and without theſe two great *Luminaries*, this dull Earth, whereon we live, would not have been an habitable World; for if we had had a *Sun* without a *Moon*, its violent heat would have dried up the Seas, and burnt the Earth up to a Cruſt; and if we had a Moon without a Sun, the Sea and Earth would have been frozen to the induration of an Icy Marble; but by the commixture of theſe two different Atmoſpheres, *(viz.)* of *Heat* and *Cold*, the Earth is made Prolifick and Fertile, and the Aerial Atmoſphere fit for the Reſpiration of ſuch compounded Animals as now live upon it.

When theſe two powerful Antagoniſts, like neighbouring Princes, do Reign in League and Amity, giving place one to the other, not invading one anothers Territories, we have then ſeaſonable Weather; but when they invigorate their Powers, and act their Antipathies upon each other, then we have violent Storms, or dreadful Thunders, as in the Ninth Chapter of *Exodus*, ver. 23. *The Lord ſent Thunder and Hail, and the Fire ran along the Ground; ſo there was Hail, and Fire mingled with the Hail, very grievous.*

If I ſhould give a particular Relation of all the Uſes and Operations of Heat and Cold, it would enlarge this Chapter beyond the Limits of my deſigned Brevity: I ſhall therefore only give Account of their attractive Powers, and ſhew their natural Uſes, and how by them they ſerve the ends of Nature.

That *Heat*, by its warm Influence upon the Earth and Waters, ſucks up and attracts both Vapours from the Waters, and Exhalations from dry and bituminous Earth, is by all taken for granted; and theſe Vapours and Exhalations, it preſently diſſipates and rarifies into thin *Air*, thereby ſupplying the defects in the *Aerial Atmoſphere*; for without daily Recruits of freſh *Air*, all living Creatures would be neceſſitated, either to breath Fire, or Corruption, which would preſently deſtroy the whole Race of Creatures that live by *Reſpiration*. And as *Heat*, by its attractive and rarefying Faculty ſupplies the defects in the Aerial Atmoſphere,

ſphere, ſo *Cold*, by its attractive and condenſing Power, only ſucks up Vapours, and when they are condenſed into Clouds, it ſends them down again in ſhowers of Rain, thereby cooling the over-heated Air, and moiſtening the dry and thirſty Earth, preparing it for the Production of the ſeveral Species, and ſorts of Vegetables which God Almighty, by his univerſal Providence, hath laid up in Nature's Store-houſe; not only for Food and Nouriſhment, for the inferior Ranks and Orders of all thoſe living Creatures, ſubordinate to Human Nature; but even for *Man* himſelf, being his *Vicegerent* upon this Earth: This attractive Power of *Cold* being a new *Hypotheſis*, which, to ſome, may either ſeem precarious, or an impoſition upon the Credulity of eaſy Readers; I ſhall endeavour to make it more clear and evident by theſe following Inſtances, which being grounded upon common Experience, cannot, without giving an Affront to Natural *Reaſon*, be deny'd.

1. Firſt, Experience tells us, that if a great Inundation be followed with an intenſe and *freezing Cold* in the Morning, it will attract and ſuck up into the Air more Water than a Week of Summer's Sun; which occaſions that vulgar Obſervation, *When a great Flood falls ſoon, it ſoon ariſeth*; again, *And when the Fogs and Miſts go*

go up by the Hill, they come down by the Mill.

2. Again, we obſerve that when the morning Cold is freezing, after a Flood, in Puddles and ſtanding Pools, the Ice is hollow, the Water being ſuck'd up from them.

3. We further obſerve, that in continued Froſts, every morning and evening, which are the times of the freezing Cold, it ſucks up out of wateriſh Ground (even through thick Boards of Ice) ſuch quantities of Water, as in ſome cold Countries, increaſe the Ice to an incredible thickneſs: This we call *Float-Ice*, from the overflowing of new Supplies of Water every Morning and Evening.

4. We further obſerve, that in lodging *Rooms*, where there is much Breath and Vapour, the external Cold, when intenſe and freezing, will attract to the glaſs *Windows* thoſe Vapours, and condenſe them into a wateriſh *hoar Froſt*.

5. And notwithſtanding that the Flux and Reflux of the Sea is occaſioned by the Rivers; yet it's very probable, that the cold Influence of the Moon does by its attractive Influence regulate the Spring-Tides.

That the *riſing* and *falling* of the *Atmoſphere* is occaſioned by the riſing and falling of theſe ſubtle Ætherial Spirits of *Heat* and *Cold*, is apparent, by the riſing and falling of *Quickſilver* in the common *Barometer*, and the Spirit of Wine in the *Thermometer*; for as it is againſt the Nature of Gravity to aſcend, ſo it ſeems a palpable Contradiction to the Laws of Gravity, that Vapour, which is a heavy Body, ſhould aſcend without the force of ſome attractive Power: It's alſo againſt the Nature of *Levity*, that a dry Exhalation, or a ſublimated Spirit, ſhould, *proprio motu*, deſcend without a Preſſure.

And it cannot be imagin'd that the external Vapours in the open Atmoſphere, which are too groſs to pervade the Glaſs of the Tube, ſhould be the cauſe of the *Quickſilver*'s riſing; or to hang *pendulous*, as it does in Mr. *Patrick*'s open pendulous *Barometer*, there muſt be then ſome other ſecret and inviſible Cauſe; and it ſeems moſt probable that the magnetick Attraction of this Ætherial Spirit of Cold, which governs the humid and vaporous *Atmoſphere*, is the true and only Cauſe, both of its riſing and falling; and in like manner, the riſing and falling of the Spirit of Wine in the *Thermometer*, is occaſioned by the riſing and falling of the Ætherial Spirit of *Heat*, which governs thoſe warm Steams and Exhalations which heat and qualify the cold and moiſt Air, and fit it for Reſpiration.

When the *Quickſilver* riſeth in the Tube, the Vapours and the Clouds riſe, dilate, and rarify into Wind, and we have dry *Weather*; and on the other ſide, when the *Quickſilver* falls, the Vapours condenſe, the Clouds fall, and Rain and Storms follow.

And on the contrary, when the Spirit of *Wine* aſcends in the Pipe, we have Rain, and when it falls we have fair *Weather*: *Heat* and *Cold* giving always place one to the other; eſpecially when they govern the Atmoſpherial Regions in Amity and Friendſhip, according to the Laws of Nature. Thus, as the *Heavens declare the Glory of God*, ſo the *Firmament ſhews forth his handy Work.*

CHAP. III.

Of the Earth *in general, with the different Natures of* Soils, *and* Virgin Earth, *with their Natural Productions.*

THE ſeveral Compoſitions of this Earth's Globe, are reducible to theſe four, *(viz.) Earth*, *Juices*, *Stones*, and *Metallick Ores*; and theſe are ſo intermingled one with another, that without underſtanding the Nature of every one in particular, the moſt ingenious *Artiſt* cannot make a Separation; I ſhall therefore firſt Treat of *Earth*, being moſt obvious and neareſt to our Senſes. *By the Earth*, I do not mean that pure and ſimple *Element*, whereof Philoſophers tell us that all mix'd Bodies are compounded; for I am of Opinion, that if we ſhould dig never ſo deep into the Bowels of the Earth, we ſhould never find any ſuch pure Elementary Earth, but what is mix'd with ſeveral *Juices, (viz) Vitriol*, *Sulphur*, *Salt*, and *Mercury*; and it's the intermixture of theſe *Juices*, which makes the Earth productive of the ſeveral kinds of Vegetables upon its Surface, ſome giving to them *Colour*, *Taſte*, and *Smell*, others *Growth* and *Increaſe*. But by *Earth*, I underſtand ſuch an earthy Subſtance, as neither melts in the Fire, nor diſſolves in the Water, as Metals and Juices do, nor is ſo compact or hard, as are Stones.

This earthy Subſtance I ſhall divide into *Soil* and *Virgin Earth*; by *Soil*, I mean the outer Coat, or Surface, which lies open to the Sun and Air; from the warm Influence of the Sun, it receives its degrees of Concoction and Digeſtion; and from the Aerial Salt and Acid, it hath its degrees of Fermentation, and from both it's made productive of Herbs, Plants, and other Vegetables; ſo that all difference in Soil, is either from the different degrees of *Heat* and *Cold*, and the circumambient *Air*, or from the ſeveral kinds of *Strata* they cover, which impregnate them with mineral Steams and Exhalations, according to their different Natures.

Mountain-Soil. The *Cold Mountains* having but the Advantage of a *ſingle* Reflection of the Sun's Beams upon them; yet their *Strata* being of a hot and ſulphurous Nature, are productive of ſuch ſorts of Vegetables as are agreeable with thoſe *Stones* and *Strata* they cover, and are beſt able to endure the Winter *Froſts* and *Cold*, and are of a combuſtible quality.

Limeſtone-Soil. The *Soil* which is the cover of *Limeſtone*, *Chalk*, *Marble*, and others of a calcinable *Nature*, being impregnated with a fertile *Salt*, are productive of great variety of fine ſweet *Herbs*, *Plants*, and *Flowers*, which afford *rich* Feeding and Nouriſhment for ſuch Cattle as feed upon them, but being of a tender Nature, will not endure the Winter *Cold*.

Freeſtone-Soil. The *Soil* which is the cover of the ſeveral kinds of *Freeſtone*, and is of a liquifiable quality, does not produce naturally ſuch variety of ſweet *Graſs*, *Herbs*, and *Flowers*, as thoſe *Strata* of a *calcining* quality; but theſe being the *Strata* of the Dales and Vallies, and having the Advantage of a multiplied Reflection of the *Sun*, a deeper *Soil*, and a warmer *Air*, than the former, makes them the moſt prolifick and fertile.

Virgin-Earth. *Virgin-Earth*, is not only that which lies under the Surface-*Soil*, which hath never been broken up, either by *Spade* or *Plough*, or has had the benefit of the *Sun* and *Air*; for in our ſinking into the Bowels of the Earth we find Beds and Kells of tough *Clay*, *Marles*, *Fuller's Earth*, and a ſoapy or greaſy white *Earth*, which is commonly the upper cover of a rich *Coal*; theſe being taken out of the Earth, and expoſed to the *Sun* and *Air*, will, within a ſhort time, be ſo modified and digeſted, as to become productive, not only of common *Graſs*, but of other *Herbs* and *Vegetables*. *Note.*

Peat Earth. And Experience tells us, that even bituminous *Peat* Earth, upon the *Cold Mountains*, when burnt, limed, and manured, and the ſulphurous and ſterile Spirits are exhaled, will produce a new Set of ſweet *Graſs*, as *Clover*, both white and red, and other *Flowers*, which is ſufficient to convince any one, that the ſeminal Forms of all *Vegetables* were at the Creation diſſeminated in the Earth; which when new modified, brings forth equivocally, and by a ſpontaneous Generation, a Production of new *Vegetables*, their latent Seeds being exerted by a new Modification of the Soil.

Note, That The Natures and Qualities of Earths may be diſcovered, either by their *Colours*, *Taſte*, or *Smell*.

Colour of the Earth. 1. Our firſt Diſcovery of the Nature of the Earth, is by the *Colour*; it's reported, that *Ariſtotle* was of Opinion, that the pure elementary Earth is void of *Colour*; and *Strato* affirms it to be *white*, becauſe *Aſhes* are *white*.

The former of theſe Philoſophers is miſtaken in his Logicks, for *Colour* is an eſſential and an inſeparable Quality of Matter; and the other is miſtaken in his Obſervations, for the *Aſhes* of Peat and Turf is of a rediſh *Colour*; but I preſume, that the Philoſopher has rather warm'd his Fingers at a Wood-Fire than one of Peat and Turf.

It's moſt certain, that all Earth is coloured, and the variety of *Colours* we obſerve is either from Mineral Exhalations, which generally carry a gliſtering and ſhining along with 'em; the *diſcolouring* from the *Sun*'s over Concoction only, is obſcure of an *Iron* colour, or black; ſo that conſiderable Conjectures may be made for the Diſcovery of *Mines* and *Minerals*, from what hath been ſaid of the Colour of the Earth.

The Smells *of the Earth.*

2. Our next Diſcovery, of the *Nature* of the Earth, is from the divers *Smells* of it.

The Works of *Nature* in producing variety of *Smells* of the Earth, deſerve our next Conſideration.

Commonly the Earth ſmells well upon the fall of the firſt Rain, after the *Heat* of *Summer* is paſt, the dry Time having ſuck'd up and drained that Humidity in the Earth, which is the only Cauſe from whence all good Smells do proceed.

The occaſion of good and bad Smells.

All *white Metals*, as *Silver*, *Lead*, and *Tin*, having more of *Quickſilver*, in their Compoſition, than of *Sulphur*, have a ſweet Smell.

All other Metals, which have much of *Sulphur* in their Compoſition, as *Copper*, *Iron*, and other Baſtard *Metals* or *Semi-minerals*, have an ill Smell, by reaſon of their being generally mix'd with *Brimſtone*, *Coperas*, or the like malignant Juices; and that *Virgin Earth*, which is the upper cover of theſe Metals, is tinctured with the ſame Smell or Flavour.

We read of ſome *Earth* that is ſo abominably ſtinking, that the Steams and Exhalations which do ariſe from theſe malignant Juices, do ſometimes not only kill the *Miners* that dig in the *Veins*, but the very Birds that fly over them.

3. *Our third Enquiry*, will be to know the Condition of the Earth by the *Taſte*.

The Taſte *of Earth.*

The curious *Miner* will leave no Experiment untry'd that may be conſiderable for his Information, and therefore uſeth *Taſte*; *pure Earth* hath no manner of *Taſte*, and the *Earth*, which is mix'd with Minerals, hath commonly a *bad Taſte*; for there is ſcarce any *Mineral* but what is *aduſt*, and they be all dry, whereas the very firſt principle of Sweetneſs is *Humidity*. The Taſte of *Mineral Earth* may be known by infuſing of it in pure and clear *Water*, eſpecially if you ſet it on the Fire, and let it boil once or twice, and then cool again; the mixture of Juice it contains, may be diſcovered by taſting the Skum which riſeth, and ſwims upon the Water.

CHAP. IV.

Of Water *in general, ſhewing the Original of* Springs, Rivers, Lakes, Ponds, Mineral Waters, *&c.*

WHEN the *Almighty* Power was pleaſed, by the Diviſion of the Waters, to cauſe the dry Land to appear, and gradually to become an Habitation for ſeveral Ranks and Orders of Creatures, compounded of Matter and Life;

The Diviſion of the Waters.

This *Diviſion* was made into *Waters ſubterrene*, *ſuperterrene*, and *nubiferous*: Thoſe Waters above the *Firmament*, i. e. without the power of this *Earth's Attraction*, were attracted to the *Moon's Center*, which by *Moſes* are called the Waters above the *Firmament*.

The *ſubterrene Waters*, are thoſe ſweet Mineral Feeders, which do implete the Body of the *Earth*, and perform the ſame

Office, that Blood does in the Bodies of *Animals.*

This Sweet Water hath a conſtant and regular Circulation through thoſe greater *Fiſſures* and *Diviſions* of the ſeveral *Claſſes* of Matter; and theſe *Fiſſures*, by the *Miners*, are called *Dykes*, *Rakes*, *Riders*, or *Veins*, according to the Nature of thoſe *Claſſes* of Matter they pervade, and they are analogous to the Veins in the Bodies of Animals: Beſides theſe greater *Fiſſures* we meet with in the Body of the Earth, we meet alſo with many ſmall *Ramifications*, or leſſer *Veins*, which feed, and keep in Life, not only the ſeveral *Mines* and *Minerals*, but even the very Stones, and different *Strata* or Layers, and Sediments of it.

The Diviſion of Fiſſures or Veins of the Earth.

And as all the great *Veins* in the Bodies of *Animals* do meet in the Neck, and from thence are divided into leſſer *Veins*, and ſome as ſmall as Hairs, which we call *Hair-Veins*; ſo the greater *Nerves*, which are called the *Septipares*, have their Original from the Head; and being divided into leſſer and ſmaller Nerves, are the Conduit-Pipes thro' which Life, Motion, and Activity is conveyed to all the Members of the Body.

In like manner, all the great Rivers upon this Earth have their Riſe from the Tops and Sides of the higheſt Mountains, following the Windings and the Turnings of theſe greater *Veins* and *Diviſions* of the Earth; and in their long Courſes, taking in thoſe Waters flowing from the *leſſer Veins*, until they increaſe to *Navigable Rivers*, and empty themſelves into the next *Sea*.

The Original of Springs.

Now to avoid all needleſs Diſputes about the *Original* of *perpetual* Springs and Fountains, we ſhall be poſitive in our Aſſertion, That they neither have their *Original* from the *Sea*, leaving behind them the *ſaline Quality*, as they pervade the ſtrait Strainers of thoſe Earths they paſs through; nor do they proceed from *Air* condenſed in the Cavities or Hollows of the Earth; or are the *Product* of thoſe *Rains* which water the Earth's Surface, but that they have their Original, Firſt, From the natural breaking out of the *Strata*; or, Secondly, By an accidental breaking of ſome of thoſe ſubterrene *Veins*; or, Thirdly, When by our diging into the Body of the *Earth* we cut them; which is the ſame with opening a Vein, or letting of any *Animal* Blood.

As for the Cauſes of *Lakes*, *Ponds*, *Mineral Waters*, their Natural and *Medicinal Uſes*, we ſhall give a particular Account of them when we come to Treat of ſuch as we have in theſe two Counties.

CHAP.

CHAP. V.

Of Stones *in general, their different* Natures, Forms, *and* caſual Impreſſions, *&c.*

THESE two *Counties* of *Weſtmorland* and *Cumberland*, being the moſt mountainous and ſtony of any Counties within this *Iſland* of *Great Britain*, it will be neceſſary that we firſt Treat of *Stones* in *general*, their *Natures* and *Figures*, before we proceed to give a particular Deſcription of the ſeveral *Mountains*, *Stones*, and *Strata* of *Matter*, with the *Mineral Productions* of theſe Counties.

And, Firſt, of the *Generation of Stones.*

The Generation of Stones.

It is moſt certain, that there is a very *active Principle*, or Virtue, that operates in the Generation of Stones, as well as upon the reſt of the *Matter* of the *Univerſe*, that is ſubject to *Generation* and *Corruption*; but the difficulty lies in knowing what that *Principle* is, becauſe it operates in no determinate place; but ſometimes Stones are made in the *Air*, in the *Clouds*, in the *Water*, and in the *Bodies* of *Animals*; and it's taken for granted, that in all Generations there are concern'd two eſſential *Principles*, *(viz.)* an *active* and a *paſſive* Principle.

Note.

In

The Principles of Generation.

In the Generation of Stones, the paſſive Principle is either *Sand* or *Slime*; thoſe generated of *Sand* are of a *liquifiable Nature*, thoſe of *Slime* are of a *calcinable Quality*.

And to theſe two kinds are all Stones reducible. As for *Flints*, they make up no *particular Stratum* of this Earth, but are a ſort of *Mundick*, lying in Beds of *Chalk*, either in Layers, or Confuſion, like *Cat-heads* in Coal-Metal, or Limeſtone-Chivers; the former *liquifies* into Glaſs as Tranſparent as *Chryſtal*, the other is of the Nature of *Iron*.

The Active Principle.

The *active Principle* in the Generation of Stones is a *petreſying Juice*, or Water. In the Hiſtory of *Peru*, we read of a Water, wherein, if the Neighbours do but immerſe either Earth or Clay, made up in Moulds, as we make up *Brick* or *Tile*, it preſently turns into a hard and ſolid Stone; and the People thereabouts build their Houſes with it; all the Cattle that drink of it die. The Colour of this petreſying Liquor is whitiſh, inclining to yellow.

But we need not *Travel* into the other *Hemiſphere* to find Water of this kind, having ſeveral Springs of this *petreſying Nature* both in *England* and *Ireland*.

The Forms of Stones.

Stones have their ſubſtantial Forms, which make them differ *ſpecifically*; yet, becauſe we cannot come to the Knowledge of them, in our *Definitions*, we are fain, by way of *Periphraſis*,

Periphraſis, to make uſe of *Accidents* and *Properties.*

Every ſeveral *Form* of Stones, is accompanied with particular Virtues, as remarkable as thoſe of *Plants* and *Animals*, and proportion'd to the length of time Nature takes in its Generation.

The Diviſion of Stones.

All ſorts of Stones may be divided into *Common* or *Precious.*

The more *Common*, are *Rocks*, *Quarries*, and the *Common Strata* of the Earth, or they are *Pebbles.*

Precious Stones are either the external *Gums* and *Exudations* of *Metallick Stones*, or they are the *internal Kernels* of ſuch.

They are either Tranſparent as the *Diamond*, or Obtuſe as the *Onyx*, or between both, as the *Jaſper.*

The Cauſe of Tranſparency and Opacity.

It's Water that is the principal Cauſe of *Tranſparency*, and the Earth of *Opacity.*

White Stones are made of a Humour almoſt like Water, and therefore are the moſt Clear and Tranſparent; ſuch is the *Chryſtal*, and *Iris*, ſo called, becauſe being held oppoſite to the Sun, it much reſembles the Rainbow.

The *Diamond* is engendered of a leſs clear Humour than the *Chryſtal*, or the *Iris*, and ſo is more obſcure than either of them.

Note.

The ſame variety may be obſerved in all *Precious Stones*, whether they be compos'd of Juices or Humours, that be Green, as the *Emerald*, or Blue, as the *Saphire*, or Red, as the *Ruby*, &c. There are ſome of mingled Colours, and ſome alſo that are not Tranſparent, which are engendered of black and thick Humours; an Inſtance whereof we ſee in Water, which, tho' it be naturally white and clear, yet mingled with Ink, it loſeth its Tranſparency, tho' not the Luſture of its Superficies.

Of the Accidents of Stones.

But beſides Shining and Tranſparency, there are other Accidents and Properties that accompany Stones, both *Precious* and *Common*; and to diſcover the Natural Cauſes of ſuch, ſome of our late *Virtuoſi* have made it their Buſineſs and Study, but with what Succeſs I ſhall not here determine.

We read of Stones, that have in their Clouds and Spots, repreſented Towers, Sheep, and other Animals, perfect and imperfect.

The Story of the *Agats* of King *Pyrrhus* is famous, that repreſented to the Life *Apollo* and the Nine *Muſes*, ſo lively as any Painter could draw them.

And it's ſaid, that in the Houſe of *Wiſdom* at *Conſtantinople*, there is a Marble-Stone, that by the very natural Veins of it, hath the Picture of *John* the Baptiſt, with his Cloathing of Camel's Hair, expreſſed to the Life,

S. Soph

Life, excepting one of his Feet, which is imperfect.

But we need not go ſo far as *Conſtantinople* for Inſtances of this kind, having the like *Mirabilia Naturæ* at Home in our own Country.

Benwell *Colliery.* In a *Colliery* at *Benwell*, near *New-Caſtle* upon *Tyne* in *Northumberland*, where the Miners ſink above the Salt-water Level, they find the *Sulphur* ſo crude, and hard, being mix'd with its Native Earth, that a Pick-Axe will ſcarce break it: *Obſerve.* But ſinking the ſame *Pit* down ſome Fathoms below the Salt-water Level, the *Sulphur* is ſo exalted and ſublimated that it will *fire* at a *Candle*, and ſometimes with the ſtroke of a Pick-Axe; and if the Miners ſhould not open their Air-Pits, and keep their Thurling-Ways clear, and frequently bruſh and ſweep the Coal-*Wall* before they fall a working, there would be ſuch Collections of theſe *ſulphurous* and *bituminous* Spirits, as would either ſet the *Colliery* on *fire*, or by kindling of a *Fire-damp*, blow it up.

It is likewiſe obſervable, that if the Water in any place of that *Colliery* ſtagnate, it will fire with a Candle, and burn like Brandy or Wine; and if the Water be fed and ſupply'd with a conſtant and perpetual Feeder of that *bituminous* Water, it would burn for Ages; and this ſeems to be the true Cauſe of *Hot Baths.*

But this is not the only thing remarkable in this *Colliery*; for we further obſerve, that where the Roof of the *Colliery* will not ſtand without ſupporting; if the Miners cut down Branches from Oak, Birch, Aſh, or any other living Tree, to make Props of, to ſecure the Work; theſe Trees, Body and Branches, with their Leaves and Lineaments, will in a ſhort time be ſo *imprinted* and painted upon the ſmooth Sill of that *Colliery*, that nothing but the *Author* of *Nature* it ſelf could produce ſuch excellent Workmanſhip. *Obſerve.*

I had this Relation from Mr. *Enoch Hudſon*, the *Owner* and Manager of that *Colliery.*

Theſe *Relations* may convince any, that there is a *plaſtick Spirit* in Nature, which where-ever it meets with theſe Chymical principles of *ſublimated Salt*, *Sulphur*, and *Quickſilver*, it will, like a Looking-Glaſs, take the lively Images of any thing, *animate* or *inanimate*; and by Virtue and Power of this *plaſtick Spirit* is Matter modified into the Form and Shape of the Bodies of *Flies*, *Inſects*, and other compounded Creatures.

I have ſeen the Impreſſion of *Fern*, *Heath*, and other Vegetables in an excellent Collection of ſuch Rarities of Nature, made by our preſent Lord Biſhop of *Carliſle*.

Formed Stones. As for thoſe Stones which go under the Name of *Formed Stones*, they are not only found upon the tops and ſides of high *Mountains*, and ſometimes incloſed in hard Rocks in Foreign Countries, but we have great variety of them here at Home, as well upon the Mountains as in the Vallies. There is a Pariſh in *Lincolnſhire*, where the *Miniſter* of it told me, they were as common and plentiful as Pebbles: He ſent me a Bag full of them, wherein there was great variety; there was one ſort I never ſaw in any other place, or among thoſe Collections made by thoſe who place a great Value upon ſuch Rarities of Nature: They call theſe by the Name of *Miller Thumbs.* The ſame Mr. *Hornsby*, the Miniſter, told me, that upon the *Commons* are daily found abundance of *Firr-Trees* lying croſs one another, and very confuſedly bury'd in the Earth; ſome above ten Foot deep, which the Neighbours dig up for *Timber*, as well as Fuel, for *Fire*, of which there is great ſcarcity and want in that County; and that which makes it more remarkable, there is neither any ſuch kind of *ſhell Fiſh* found in our Seas, nor was there ever known any Firr Trees to grow naturally in that Country.

Petrefied Shells.

Some Years ago being at the Duke of *Somerſet*'s Houſe in *Suſſex*, there were *Maſons* there cutting and poliſhing of Marble, which was made up of nothing but *Cockles* of all ſorts, great, middle ſized, and ſmall ones, ſome of them lying *upwards* and ſome *downwards*, with the ſmalleſt Lineaments of their Shells drawn in great Perfection; and theſe *Maſons* told me, that theſe Stones were got in the middle of the Country, at a diſtance from the Sea.

It ſeems moſt probable, that thoſe *Firr-Trees*, bury'd under Ground in *Lincolnſhire*, were brought thither by the Devaſtations made by *Noah's* Flood: But it cannot be imagin'd, that thoſe *ſhell-Fiſh* ſhould be lodged and petrefied to Stone, upon the Tops of high Mountains, and incloſed in the middle of hard Rocks by that *general Flood*; but it ſeems more likely, that when God by the *Diviſion* of the Waters, made the dry Land to appear, theſe *ſhell-Fiſh*, which were not *Loco-motive*, were left behind, and by the general Petrefaction, with the reſt of the now *ſolid Strata*, were petrefied into Stone: But becauſe I would not willingly over-burthen the Credulity of the *Reader*, I will proceed to the next Chapter.

CHAP. VI.

Of the different Claſſes *of* Matter *of the* Earth, *with their Natural Productions; but more eſpecially of the different* Claſſes *of theſe two Counties*, &c.

The Original of Claſſes.

WHEN the ſeveral *Sediments* of Matter, of which this Earth is compounded, did ſettle into the Form and Figure it is now in, all the *Sediments* of the ſame Nature, and Affinity, by an agreeable *Juxta-Poſition* of Parts, drew together and were *petrefied* into theſe *ſolid Stones*, or *Strata*, we now find them in; and every particular *Claſs* of Matter is productive of ſome *Mine* or *Mineral* peculiar to that Claſs, and is the Perfection of it.

The Diviſion of Claſſes.

The ſeveral Claſſes are *divided* by the *greater* Rivers, which always follow the *Windings* and *Turnings* of the greater *Fiſſures*, which divide the Earth; which will be more apparent when we ſhall give a particular Deſcription of the different Claſſes, into which we have divided theſe two Counties: And, Firſt, of the *Eaſt Claſs*, or *Diviſion*.

CHAP. VII.

Of the Eaſt Claſs, *with its Mineral Productions*, &c.

BEFORE I proceed to give a particular Deſcription of this *Claſs*, I think it neceſſary to give a ſhort Deſcription of the Mountainous Heath of *Stainmore*, which divides the two Counties of *Weſtmorland* and *Yorkſhire*.

This ſpacious and ſtony Heath, from whence it hath its Name of *Stainmore*, or *Stonemore*, is in or about the middle of this Iſland. It's in length Sixteen Miles, and in breadth about Ten. It hath a gradual Aſcent from *Brough-Town* to the *Grained-Tree*, which is a Boundary-Mark in that part, dividing *Weſtmorland* from *Yorkſhire*. The Riſe of the Ground for four Miles together, will anſwer one Yard in twenty; ſo that by a moderate Computation, the perpendicular Aſcent to the Summit of it, would be three hundred Yards, which occaſions the frigidity of the Air always upon it: From the *Grained-Tree* to *Bowes-Town*, it lies much upon a Level; and thence, it hath a gradual Deſcent to *Greta-Bridge*. This high Mountain-Heath divides the Southern and Northern Climates, giving to the Southern Counties a more early Spring-Seaſon by twenty or thirty Days, than to the Northern part of the Iſland. But this Want of ſo early a Spring, is repaired by the Continuance of the *Sun*, and the *Autumn-Seaſon*, as many days longer; ſo that our *Winter* ſeldom begins before *Chriſtmaſs*. From this *Heath*, which ſeems to be the *Ridge* of the *Iſland*, all thoſe *Eaſtern* and *Weſtern Mountains* in *Cumberland* and *Weſtmorland*, take their Riſe; which, by Expanding their Arms, incloſe a great part of theſe two Counties. From the Northern Skirts of this Heath, riſeth the Head of the River *Eden*.

The East Claſs: This *Eaſt Claſs* is divided by the River *Tyne* on the *Eaſt*, and the River *Eden* on the *Weſt*.

Tyne hath its Riſe from the Eaſt-ſide of *Croſs-Fell*, following the *Fiſſure* down the Precipice of the *Mountain* to *Garragil*, and thence through *Aldſtone-moor-Dale* to *Knars-Dale*, where it enters into *Northumberland*, following the greater *Fiſſures*; and in its long Courſe, receiving into its Stream the leſſer Rivulets, flowing from the leſſer Veins, *Newburn:* 'till the Tide meets it at *Newburn*, within four Miles of *Newcaſtle*, where it becomes Navigable; and about eight Miles below that great *Town*, it empties it ſelf into the Sea.

This *Claſs* conſiſts of a *Ridge* of *Mountains*, extending from *Stainmore* on the *South-Eaſt*, to *Gilſland* on the *North Weſt*, in length about twenty Miles. The Summit of this long *Ridge* of *Mountains* is *Croſs-Fell.*

Hilton-Fell:

1. The firſt Elevation of this Ridge to the *Eaſt*, is called *Hilton-Fell.* The word *Fell*, according to our Country Dialect, ſignifying a leſſer Mountain.

The preſent Poſſeſſion of the Mannor and Royalty, is in the Family of the *Hilton*'s, and the Lord *Lonſdale*, a late Purchaſer.

The *Mineral* Productions are *Lead* and *Coal*, which being of a diſagreeable Nature, the one makes the other of little Value.

The Proſpect of *Lead* upon this *Fell*, is only from the appearance of ſeveral Veins of *Spar*, *Soil*, and *Vein-Stone* breaking out upon the Surface; and theſe being oftentimes either unripe or dead Veins, cheat the *Miners* with vain Hopes.

Dufton-Fell.

2. The ſecond Elevation of this *Ridge*, is called *Dufton-Fell*; the Mannor and Royalty is in the Poſſeſſion of Mr. *Winder*, Son and Heir to the late Ingenious Lawyer *Winder*, his Father.

The *Mineral* Productions of this *Fell*, are chiefly *Lead*, of which there is ſuch Plenty got, as keeps a *Lead-Mill* for the moſt part ſmelting down the *Ore*.

That which is here moſt remarkable is, that all the *Ore* got upon this *Mountain*, is not found in Natural *Veins*, which run down perpendicularly, or ſloping, which is moſt uſual, but in Seams like Coal, which run parallel, being incloſed within the *Strata* of a hard and ſolid *Lime-ſtone* Sill, without any conſiderable Depreſſion from the *Horizon.*

Flat, or Float-Ore. This we generally call *Flat-Ore*, or rather *Float-Ore*, being the over-flowing of a *rich Vein*; and doubtleſs, if the *Miners* would be at the charge of croſs cutting the Riſe of this *Lime-ſtone* Sill, they would diſcover the *Vein*, from whence this *Ore* does flow.

A petrefying Spring. Upon this *Mountain* there is a *petrefying Spring*, which turns Moſs, or any other porous Matter, that either falls into the Water, and ſucks it up, or comes within] the Steams and Vapours that ariſe from it, into hard Stone; inſomuch, that upon the Mouth of the Well, there is rais'd a conſiderable Hill of ſuch *Petrefactions.*

The Manager and Steward of theſe Veins, is the Judicious Mr. *Barrow.*

Silver-band, *of the Name of it.* 3. The third Elevation of this *Ridge* of *Mountains* is called by the Name of *Silver-band*; which Name it has either by the large Subſtance of *Silver* got by the Product of the *Ore*, or from the Nature of the *Ore*; which, when refin'd by Art, yields a valuable

able Product of *Silver*. The Mannor and Royalty is in the Poſſeſſion of the Earl of *Thanet*; the Leſſee and Manager, is the Ingenious and Famous Mr. *Bacon*, who, by his great Judgment and Adventures in *Minerals*, hath advanced to himſelf a great Eſtate in *Northumberland*.

Blencarn-Fell.

4. The fourth Elevation is called *Blencarn-Fell*: The *Mineral* Productions, by the *Veins* of *Spar*, and *Soil*, which appear at day, ſeem to be *Lead*, there being as yet no Tryals made. The Lord of the Mannor is Mr. *Thomas Lough*.

Kirkland-Fell.

5. The fifth Elevation is called *Kirkland-Fell*, which, as well as the other *Mountains* upon the ſame *Claſs*, hath its *Veins* of *Spar*; but as yet there have been no Tryals made. The Lord of the Mannor is Sir *William Fleming*, Baronet.

Croſs-Fell.

6. The ſixth and higheſt Elevation is *Croſs-Fell*, which is the Summit of this *Ridge* of *Mountains*; it was formerly called *Fiends-Fell*, from evil Spirits which are ſaid in former Times to have haunted the Top of this *Mountain*; and continued their Haunts and Nocturnal Vagaries upon it, until St. *Auſtin*, as is ſaid, erected a Croſs, and built an Altar upon it, whereon he offered the *Holy Eucharist*, by which he countercharm'd thoſe *helliſh Fiends*, and broke their Haunts.

The Name of it. Since that time it has had the Name of *Croſs-Fell*, and to this day, there is a heap of Stones, which goes by the Name of the *Altar upon Croſs-Fell.* This is an old Tradition that goes current among the Neighbourhood, but the Reader may chuſe whether he will give it Credit or not.

The Riſe of Rivers. From the upper *Strata*, as well as from the Sides and Skirts of this high *Mountain*, breaks not only out ſeveral rapid Rivulets, as *Blackburn*, *Keſhburn*, and others, but theſe three famous Rivers, *(viz.) Tyne*, *Wear*, and *Tees*, which, before they fall into the Sea, are all Navigable.

Tyne, as we have ſaid, hath its Courſe through *Northumberland* to *Newcaſtle*, thence to the *Shields*, and at *Tinmouth*-Bar it falls into the Sea.

Wear runs through *Wardale* to *Durham*, and thence to the Sea.

Tees makes its way through *Teeſdale* to *Bernard-Caſtle*, and ſo to *Yarham*.

As this *Ridge* of *Mountains*, did by gradual Aſcents and Elevations ariſe from *Stainmore* to the Summit of *Croſs-Fell*, ſo by gradual Deſcents and Depreſſions it ſinks down 'till the Mountains dilate, and ſpread into the level Country we call *Gilſland*, in the Borders of *Scotland*.

Ousby-Fell. 1. The firſt Depreſſion is *Green-Fell*, which adjoins to *Croſs-Fell*, and are both within the

Mannor and Lordſhip of *Ousby* and *Bank*, and is in the Poſſeſſion of *Motterom Crackenthorp*, Eſquire, who is the ſole Lord of the Royalty.

The *Mineral* Productions of this large Mannor, are *Lead*, *Copper*, *Coal*, and *Oker*. The only *Vein* now wrought, is called *Keſhburn-Vein*, in which formerly great Quantities of *Ore* have been got, which turned to a good Account, and is yet an Encouraging Proſpect, the *Sills* all riſing with the *Mountain*.

There are in this Mannor very fair and hopeful Appearances of *Veins*, which, if thoroughly try'd by a Man of Purſe and Judgment, might turn to the great Advantage of the *Leſſor*, as well as *Leſſee*. The *Copper* is very rich, but ſo intermix'd with the *Lead Ore* in the ſame *Vein*, that it requires ſome labour to ſeparate them.

The great Sulphur Vein.

In this Mannor there is a mighty *Vein* of *Copperiſh Sulphur*, two Yards wide, which the Rivulet called *Blackburn*, that divides the Mannors of *Ousby* and *Aldſtone-moor*, diſcovers. I doubt not, but if this *Vein* was ſunk down 'till it got its natural Feeder, it would turn to a rich *Vein* of *Copper*; for it is very uſual in the Rich Kingdom of *Peru*, which ſo abounds with *Minerals*, that it ſupplies a great part of *Europe* with Bullion, that the richeſt *Veins* are *Sulphur* at the Top, and as they get more Moiſture, turn to *Copper*, and when ſunk deeper into the *Veins*, turn to *Silver*.

The *Coal* lieth upon the inſide of the *Mountains*, and is ſo broken by the general Flood, that it turns to no Account, either to the *Lord* or *Farmer*.

Before I leave the Deſcription of the Mannor and Royalty of *Ousby*, I cannot forbear taking notice of the Diſcoveries made in that Mannor by *Edward Baynard*, Eſquire, Doctor of Phyſick, who having Marry'd the Virtuous Lady Madam *Ann Crackenthorp*, Relict of *Chriſtopher Crackenthorp*, Eſquire, who having for her Jointure and Settlement, the whole Mannor and Royalty of *Ousby* and *Bank*, gave him a Property to thoſe Mannors during his Wife's Natural Life. This worthy Gentleman having a rich *Lead* Work upon the *Mountains*, took pleaſure, not only in viewing the Management of that Work, but having a *Mineral* Spirit, and being Curious in making Natural Obſervations, took occaſion frequently to ſurvey our *Mountains*, where he diſcovered a *Chalybiate* Water breaking out from the upper *Strata* of *Croß-Fell*, ſo rich of the *Mineral*, that the very Vapours ariſing from it, tinged not only the adjacent Stones, but diſcoloured the Graſs and Herbs about it. The Skum of the Water where it ſtagnates, is near as thick as Cream upon Milk; the *Medicinal* Uſes of it I leave to the Judicious Diſcoverer: Beſides, he diſcovered a rich *Vein* of *Oker,* which, if it were near the Sea, would be of good Value.

He diſcovered alſo ſeveral *Veins* of *Lead*, which, if a good Underſtanding could have been had between him and *Richard Crackenthorp*, Eſquire, his Son-in-Law, might have been of great Advantage to them both.

2. The ſecond Depreſſion is *Melmerby-Fell.* *Melmerby-Fell.* The Lordſhip and Royalty of that Mannor is in the Poſſeſſion of *Thomas Pattiſon*, Eſquire; the *Mineral* Productions are *Lead*, of which ſome Quantities have been got; the *Veins* are very hopeful, but no thorough Tryals have as yet been made.

3. The third Depreſſion is *Gamblesby-Fell*, *Gamblesby-Fell.* known by the Name of *Hartſide-Fell.* The Mannor and Royalty was formerly in the Poſſeſſion of the Crown, but now in the Poſſeſſion of the Lord *Portland*.

The *Mineral* Productions are chiefly *Coal.* There is ſome appearance of *Veins* of *Glaſſy Spar* and *Float Copper*, but no Tryals of either have been made. *Here* the *Metallick Claſs* changeth into a *Claſs* of *Coal*; and we obſerve, that as the *Lead* does gradually go *Obſervation:* off, ſo the Seams of *Coal* do gradually come in and increaſe. The Seam of *Coal*, which is called *Hartſide-Colliery*, is but half a Yard thick, and for many Years hath ſupplied the neighbouring Towns with *Coal*.

Busk-Fell. 4. The fourth Depreſſion is *Busk-Fell.* The Lord of the Mannor and Royalty is the Lord *Suſſex*; the Mannor-Houſe is *Kirkoſwald-Caſtle*. In this Mannor there is no outward appearance, either of *Lead* or *Coal*.

Renwick-Fell. 5. The fifth Depreſſion is *Renwick-Fell*; the Lordſhip whereof is in the Poſſeſſion of *Queen*'s College in *Oxford*. The *Mineral* Production of this *Fell*, is *Coal*, which is now increaſed from half a Yard to a three quarters Seam; this hath been an antient *Colliery*, but never effectually managed.

Croglain-Fell. 6. The ſixth Depreſſion is *Croglain-Fell*; the Lordſhip and Royalty belongs to the Lord *Wharton*. Here have no Tryals been made, either for *Coal*, or other *Minerals*, that I have account of.

Upon the inſide of this *Fell*, breaks out a *Chalybiate* Water, very ſtrong of the *Mineral*. It is found by Experience to be an excellent *Antiſcorbutick*; it cleanſeth and ſweetens the Blood, &c. and is much frequented by People under ſeveral Diſtempers.

Coal-Fell. 7. The laſt and loweſt Depreſſion of this *Ridge* of *Mountains*, is called *Coal-Fell*. It hath its Name from the *Colliery*. Here the *Coal Claſs* is in full Strength and Perfection, the Seams of *Coal* at their full height and growth. This *Colliery* is ſo antient, that we cannot find out the Original of it: It ſupplies *Carliſle* and the Country near it. The Mannor and Royalty is in the Poſſeſſion of the Earl of *Carliſle*; the preſent *Leſſee* is the Ingenious Mr. *Mowberry*. Here alſo is the *Mountain Strata*, and the *Mineral Claſs* changed into a *Claſs* of Red *Free-ſtone*, which overſpreads all *Gilſland*; in which, towards the Borders of *Northumberland*, is a *Sulphur-Spaw*, ſo ſtrong of the *Mineral*, that the ſmell of the Water may be ſmelt at a great diſtance from it. It tingeth *Silver* with a *Goldiſh* or *Copperiſh* Colour: It ſeems by the *taſte* and *ſmell* it hath of *Gun Powder*, to have ſomething of *Nitre* in it. By *bathing* in it, it cures *Itches*, *Scabs*, and *Ulcers* in the Fleſh and Skin; as for the inward Operations of it, I leave 'em to the Profeſſors of Phyſick to diſcover.

Of the Sulphur-Spaw.

Gilſland.

The Surface-*Soil* of this *Claſs* is light and ſandy, and is more proper for the Production of *Rye*, than any other ſort of Grain.

Upon the *Eaſt* ſide of this *Ridge* of *Mountains*, lies *Aldſtone-moor-Dale*. It conſiſts of the ſame *Strata* with the *Mountains*, and is productive of the ſame kinds of *Minerals*, eſpecially of *Lead*, which hath contributed much to the enriching of the Inhabitants of the *Dale*, as well as of the *Leſſees* and Managers of the *Veins*.

Aldſtone-moor-Dale.

In that part of the *Dale* which lies near the River *Tyne*, for want of the warm Influence of the Sun, which is often skreen'd and clouded by the Fogs and Miſts hovering upon the Mountains, grows little of any kind of *Corn*; yet, by the manuring of the *Soil*, it's made to bring forth great plenty of rich and fatning Graſs; and produceth as great variety of *Herbs*, *Plants*, *Flowers*, and other Vegetables, as any Place I know of in the *Iſland*. The occaſion of theſe rich Productions is not only to be attributed to the Manure, but to thoſe warm *Mineral* Sills and Stones, which lie under the *Soil*, which feed and nouriſh 'em with thoſe warm and moiſt Steams and Vapours which do ariſe from them, like as hot Beds in Gardens force a more timely Spring than in open Countries.

The Weſt ſide of the Mountains.

The *Weſt* ſide, or Skirts of theſe Mountains, from *Brough under Stainmore*, to the City of *Carliſle*, ſeems to be *Earth* ſuperinduced upon the *Mountain-Strata* by the general Flood.

It generally conſiſts of a light ſandy *Soil*, being the Cover of a ſoft, rediſh, hungry Free-ſtone; which rather ſucks to it the Spirit and Moiſture of the *Soil*, than contributes toward the Fertility of it; and if it be not fed and nouriſhed with conſtant Supplies of Manure, or frequently laid to Fallow, that it may, by the Aerial Salt, and the Sun's Concoction, recover its waſted Strength, it would be reduced to that degree of Sterility, as not to anſwer the Husband-Man's Expectation.

Theſe *Vallies*, indeed, by the ſide of the River *Eden*, being of a deeper *Soil*, and frequently overflowed by that River, makes them more fertile, than thoſe declining Grounds lying upon the Skirts of the Mountains, whoſe *Soil*, by great Rains and Floods, waſheth down into the *Vallies*.

Of Rivulets, their Riſe.

Beſides, thoſe great Rivers that have their Riſe from the Tops and Sides of the higheſt Mountains, there breaks out from the Skirts or lower *Strata* of this *Ridge*, more than thirty leſſer *Rivers* and *Rivulets*, which ſupply the lower Grounds with plenty of Water; and theſe, from their very Fountain-heads, do flow with ſuch Rapidity, that every particular *Rivulet* affords both Water and Force to ſerve a Corn-Mill: Every little *Fell-ſide Town* hath its *Rivulet* running through it, or by it; which the Inhabitants call *Becks* or *Burns*, as *Ousby-Beck*, *Kirkland-Beck*, &c.

All the ſolid *Strata* upon theſe Mountains have their *Horizontal* Depreſſions, which the Miners call *Dibbing* and *Riſing*, and their Riſe is moſt commonly to the Sun.

The Surface-Productions of this Claſs, are ſuch as are peculiar to the *Mountains*, *Heaths*, or *Dales*; a Catalogue whereof will be annex'd to this Treatiſe.

CHAP. VIII.

Of the Second Claſs, *bounded by* Eden *on the* Eaſt, *and* Pettoral *on the* Weſt, *with its* Mineral *Productions.*

***The River* Eden.** THE River *Eden* hath its Riſe from the Mountains of *Stainmore*, its Courſe is by *Appleby*, *Templeſourby*, and *Eden-Hall*, where it takes into its Stream the Rivers *Eamont* and *Lowther*, which make a conſiderable Increaſe to it; and as it glides by *Langwathby*, *Great Salkeld*, and *Kirkoſwald*, it takes into it all the *Fell-ſide Rivulets*; and at *Carliſle*, it takes in both *Pettoral* and *Caldew*, and empties it ſelf into the Sea at *Rowcliff*.

If the City of *Carliſle* would lay out that Money got for an Equivalent for their *Tolls*, it would go near to make the River *Eden* Navigable at *Carliſle*, which undoubtedly would be to the great Advantage of that City, the two Kingdoms now being united.

This River breeds great plenty of that Fiſh we call *Trouts*; and if it were not for theſe *Bays* and *Damms*, which ſtop the *Salmon* from coming up to ſpawn and breed in the Spring-heads of this River, we ſhould have in our Markets greater plenty of this Fiſh, and at cheaper Prices.

The Strata *of* Weſtmorland.

The *South Eaſt* part of this Claſs or Diviſion, in the County of *Weſtmorland*, conſiſts much of the ſame *Strata* with *Stainmore*, and produceth valuable Veins of *Lead*.

At *Regal* and *Slegal*, we meet with ſome ſmall Seams of *Coal*, the main Body of the *Coal* lying upon *Stainmore-Heath*; ſo that if the *Miners* ſhould ſink there for a lower *Coal*, and a thicker Seam, they would run a hazard of loſing both Labour and Money.

Note.

For as in all *Claſſes* of *Coal* the Seams gradually increaſe in thickneſs 'till they come to their full height and growth, ſo they gradually decreaſe 'till they dwindle out into ſmall Seams, and then the Covers change, and the *Coal* goes out.

The lower part of this *Claſs* is generally *Lime-ſtone*, which of all others is the moſt *prolifick*, and hath the greateſt *Feeder* of Water upon it. It feedeth the upper *Soil* with a moſt fertile *Salt*, and moiſtens it with the Vapours ariſing from its Feeder.

Its *Soil* does not only produce the greateſt variety of *Herbs*, *Plants*, and other kinds of fatning *Graſs*, but all ſorts of *Trees*, eſpecially ſuch as bear Fruit, as *Apples*, *Pears*, and *Stone-Fruit*, delight to grow upon a *Lime-ſtone* Earth; for by ſpreading their Roots among the open Joints of the *Lime-ſtone*, they ſuck in the *Mineral* Spirit, with that *ſaline Juice*, which is more agreeable with their Natures than the Spirits and *Juices* of any other Earth or *Soil*, unleſs forced by *Cultivation* and *Manure*.

And hence it is that this County produceth more Fruits of all kinds than *Cumberland*, though of a lower Situation.

For theſe and the like Advantages of Nature, I cannot but take notice of *Lowther-Hall*, the Seat of the Right Honourable the Lord *Lonſdale*, in the bottom of *Weſtmorland*, as they call it, as having all the Advantages of a Natural *Situation*.

The Situation of Lowther-Hall.

For it is not only by the *Elevation* of the Ground, freed from thoſe Fogs and wateriſh Froſts, which in the Spring-Mornings, by the *attractive* Power of the *Water-Cold*, draw down to the Rivers; which either ſo corrupt the Air, as to breed Flies, and other noiſome Inſects; or by the Intenſity of its *freezing*, kills the *Fruit* in the *Bloſſom*, but is alſo ſo much below, and at ſuch a diſtance from the Mountains, that all thoſe fierce and rapid *Blaſts* of Wind, occaſioned by their Declivities, are either ſpent, or ſtrike a Level before they reach it. Yet this *Situation* hath ſo much Advantage from the Mountain-*Winds*, as to bruſh and fan the *Air*, and preſerve it from *Stagnation* and *Corruption.*

It is not only fenced from violent *Winds* by all kinds of Foreſt-*Trees* of Nature's own Production, but adorned and beautified by ſuch Foreign *Trees* and *Winter-Greens* as are raiſed by human Art.

It hath by Nature ſuch a gradual Aſcent to the Houſe, as makes the *Avenue* to it moſt noble and magnificent.

Its Situation is upon a *Lime-ſtone* Rock, which does not only ſecure the Foundation, but ſo fertilizes the Earth and Soil, as to make it proper for *Gardens*, *Orchards*, *Terras-Walks*, and other moſt delightful Conveniences.

The *Demeſn* and *Parks*, which ſurround the Situation, are of the ſame fertile *Soil*, producing rich and plentiful Crops of Graſs and Corn.

The Elevation of its Situation, gives it a moſt curious Landskip of *Woods*, *Waters*, *Mountains*, *Rocks*, *Towns*, *Churches*, and *Caſtles*, which entertain the Eye with a delightful Proſpect.

Thoſe thick and pleaſant Copſes of Wood and Trees by the ſides of the River *Lowther*, near two Miles in length, do ſo multiply, refract, and reflect the *Sun-beams*, that it enjoys as warm, and a more fragrant Air, than the lower *Dales* and *Vallies*; and it hath the convenience of a plentiful *Market* within three Miles of it.

This *Lime-ſtone Claſs* dilates and ſpreads over a great part of *Weſtmorland*, and is not quite cut out 'till we come to *Eamont-Bridge*, within a Mile of *Penrith*; there the Rivers of *Eamont* and *Lowther* join their Streams, and meeting with a croſs *Fiſſure*, running full Eaſt from the Bridge, they follow the windings and turnings of it until they fall into *Eden*, above *Eden*-Hall Town.

Eamont *and* Lowther *Rivers join.*

Penrith-Fell.

And as this croſs-running *Fiſſure* divides this part of *Weſtmorland* from *Cumberland*, ſo it divides and changeth the *Strata* into a *Claſs* of Red *Free-ſtone*, of a round *grit* and *nitrous* quality, which occaſions the Sterility of the Surface.

This *Claſs*, or *Vein* of Red *Free-ſtone*, extends from the Diviſion of the Counties in a ſtraight Line, 'till it comes to *Carliſle*, paſſing through *Penrith Fell*, *Lazonby-Fell*, *Barron-Wood*, and ſo forward with little change or alteration, unleſs in hardneſs and ſoftneſs.

Theſe *Strata*, or *Beds* of *Stone* and *Quarries*, are ſo broken by the general *Flood*, that they have no certain *Dibb* and *Riſe*, but generally lie in great Confuſion.

In all theſe *Quarries*, wherein Men have digged the deepeſt for Stone, we cannot obſerve the leaſt change or alteration, but a continued Rock.

The *Soil* of this *Claſs* is very *ſterile* and *barren*, producing only *Fern*, *Heath*, *Bent*, and a lean hungry *Graſs*, unleſs by the ſides of the Rivers, or where the Nature of the *Soil* is changed by *Burning*, *Liming*, and *Manure*; and as this *Claſs* is *barren* and *ſterile* in its Surface, ſo is it as *ſterile* in its *Mineral* Productions, the Nature of the *Strata* being inconſiſtent and diſagreeable with the Nature of *Lead*, *Copper*, *Coal*, or any other *Mineral*, unleſs *Iron*; and the *Miner* may dig to the *Center*, before he find it, for there is neither any outward or inward appearance of any Sign or Symptom of it, but the *Colour* and *Tinge* of the Stone.

Beſides, theſe *Rocks* and *Quarries* are ſo broken, that they are drained of all their Natural Feeders: We find not one rapid Stream flowing either from the Tops or Sides of the Hills.

This *Claſs* is too barren to enlarge more upon it, I ſhall therefore in Poſte-haſte ride over this ſixteen Miles-Stage, and go to another *Claſs*, which I am in hopes may entertain us with greater Variety.

CHAP. IX.

Of the Third Claſs, *with its* Mineral *Productions*, &c.

THIS *Third Claß* in *Weſtmorland*, hath the River *Lowther* on the *Eaſt*, and *Eamont* on the *Weſt*. Its *Figure* is *Triangular*, the loweſt *Angle* terminating at *Eamont-Bridge*. It's ſo *Rocky* and *Mountainous*, that it occaſioned a young waggiſh Scholar in his *Iter Boreale*, to make this gingling Obſervation of it, *Nubila Weſtmoorland, Saxoſa eſt miſera poor Land*. Tho' this County be Stony and Mountainous, yet the *Strata* being generally *Lime-ſtone*, ſo fatten and enrich the Soil, that it produceth plentiful Crops of fatning Graſs, and ſeveral kinds of Corn in good Perfection; it alſo breeds better and larger Cattle, both Sheep and Beaſts, than *Cumberland*, its adjoining County; and the Inhabitants, generally ſpeaking, are more Induſtrious.

Hartley-Fell.

This County wants not its *Mineral* Productions. In the late Sir *Chriſtopher Muſgrave's* Time, at *Hartley*, were great quantities of *Lead* got, in a very rich *Pipe-Vein*; and if *Purſe* and *Judgment*, *Induſtry*, and a *Mineral Spirit*, ſhould meet together in one Man, much more might be got in the ſame *Vein*, and other *Veins* diſcovered.

At *Waſtall-Head*, where *Motterom Crackenthorp*, Eſquire, hath the *Mannor* and *Royalty*, I obſerved a *Vein* of *Sulphurous Copper*, breaking out at day, which, upon a thorough Tryal, might turn to a good Account; in this County there be ſeveral *Veins* of *Lead*, which undoubtedly, if ſufficiently wrought, would anſwer to a good Account.

The middle Claſs *in* Cumberland.

But leaving *Weſtmorland* for a while, we will endeavour to make Diſcoveries of ſuch *Mineral* Productions as *Cumberland* affords in this *Third Claſs*; which is divided and bounded by the River *Pettoral* on the *Eaſt*, and *Caldew* on the *Weſt*: We have a *Vein* of *Lime-ſtone*, which, from the Boundaries of *Weſtmorland*, paſſeth in a ſtraight Line thro' the Villages of *Stainton*, *Allenby*, and *Lammonby*, 'till it comes to *Sourby*-Paſture, where a *Claſs* of *Coal* begins gradually to come in.

At its firſt Diſcovery, it is but eight or nine Inches thick, but the Roof and Covers being ſtrong, it is a workable *Coal*; and if a *Level*, which would not coſt above Two hundred Pounds, were brought up to drain it, it might be a laſting *Colliery*, having a very large *Spread* of Ground, and be very convenient and beneficial for *Penrith*, which hath want of nothing but *Fuel*.

This ſmall Seam, with its *Lime-ſtone* and gray *Free-ſtone* Covers, croſſeth *Caldew* in a ſtraight Line; and entring into Mr. *Denton*'s

Demeſn, there come on new and ſtronger Covers, and the *Coal* is increaſed to the thickneſs of fourteen *Inches*, and is workable; from thence it continues its Spread into *Warnhall-Fell*, where it is increaſed to half a Yard, and is a very antient *Colliery*, which hath ſerved the neighbouring Towns for ſome Ages, and may continue for ſeveral more, the *Coal* ſpreading over all that *Heath*: It hath a very ſtrong *Roof* of *Black Plate*, part of which is taken down in working.

The growth and increaſe of Coal.

The Royalty of this *Colliery* was formerly in the Poſſeſſion of the Crown; but now, with all the Foreſt of *Englewood*, is in the Poſſeſſion of the Lord *Portland*.

This *Vein* of *Coal* keeps its Courſe into the Mannor of *Weſtward*, where the Covers of the *Coal* improve in pinguidity, and the Seam in thickneſs, being now a Yard thick; here likewiſe comes in a ſmall Seam of *Kennel-Coal*. The Lord of this Mannor is the Duke of *Somerſet*.

From *Weſtward* this *Vein* or *Claſs* of *Coal* ſpreads along in a ſtraight Road, 'till it come into the Mannor of *Bolton*; where the *Coal* is increaſed to ſeven Quarters, or two Yards, in thickneſs, and the *Kennel-Seam* to a Yard, the *Craw-Coal* to three Quarters. Here the *Claſs* of *Coal* is come to its full Growth and Perfection; and continues its ſpread over a great part of that *Level* part of the *County*, to the *Scotch* Sea. The Royalty of this Mannor is likewiſe in the Poſſeſſion of his Grace the Duke of *Somerſet*.

CHAP. X.

Of the Fourth Claſs, *or the* Weſtern Mountains, *their* Mineral Productions, *with an Account of the ſeveral* Lakes *and* Ponds, *and the River* Darwent, *with the kinds they breed*, &c.

Of the Weſtern Mountains, their poſition and conſiſtencies.

THE *Weſtern* Mountains have their Riſe alſo from *Stainmore*, and gradually aſcend to *Skidday*, or *Skyday*, ſo call'd from the height of it. It is the higheſt Summit of all theſe *Mountains*, and of the ſame Degree of *Altitude* with its oppoſite Mountain, *Croſs-Fell*, and *Scruffle*, in the Borders of *Scotland*; and this appears not only by our *Levelling*-Inſtruments, but by the falling of the *Atmoſphere*, which occaſions that common Obſervation, *When* Skyday *has a Cap*, (viz. *of Snow)* Scruffle *wots full well of that.*

Theſe *Weſtern* Mountains differ from thoſe on the *Eaſt*, both in *Nature* and *Poſition*. The *Eaſt* Mountains conſiſt of ſeveral *Strata*, having an eaſy *Horizontal* Depreſſion.

The more particular *Strata* on which theſe high Mountains are built, are the *Hazel Grit*, which is a *Mineral Free-ſtone*, *Iron-ſtone*, and a *blackiſh Stone*, which is peculiar to theſe Mountains. All theſe have their Covers of black *Plate* or *Chivers.*

The Poſition of theſe *Mountains*, as we have obſerved, is in an extended *Ridge:* The *Weſtern* Mountains are of a quite different Nature, conſiſting of a *Blue Crag*, or continued *Rock*, without any *Horizontal* flat Beds. I have my ſelf been in a *Copper Vein* twenty Fathom deep, and could not obſerve in the ſides of the *Vein* one flat *Bed*, or Change; and I am of Opinion, that it would have continued the ſame from the Surface to the Center.

The Poſition of theſe *Mountains* are in confuſed and irregular Cluſters, ſome meeting in Angles, others bellying out in the middle, and inclining to meet at both ends. This occaſions thoſe *Dales* we have among them, as *Patterdale*, *Matterdale*, *Langdale*, and *Borrowdale*, &c.

This cauſeth alſo thoſe large and deep *Lakes* and *Ponds* of Water, we have among theſe Mountains, which having ſmall *Rivulets* running through them, preſerve the Water in thoſe deep *Ciſterns* from Corruption, and feed and nouriſh thoſe ſeveral kinds of *Fiſh* bred in them.

The moſt remarkable of which is *Ulls-water*, being about three Miles in length, the River *Eamont* in a ſmall Stream running through it. This Lake is near a Mile in breadth. The *Fiſh* bred in it are *Trouts*, which are eſteemed the beſt and largeſt in *England*. The *Fleſh* upon them is as Red and Criſp as that of *Salmon*. I have ſeen ſome of thoſe they call over-grown *Trouts*, near two Foot in length. *Ulls-water.*

The ſecond remarkable *Lake* is called *Keſwick-water*, ſome Miles in length, and in ſome places near half a Mile in breadth: In this large *Expanſion* of Water, there are ſeveral little *Iſlands*; upon one of which, which is called the Lord's *Iſland*, there was a large and convenient *Houſe*, with *Gardens*, *Orchards*, and other Conveniencies: It was formerly (in the Times of the *Scots* Invaſions) the Habitation of the *antient* Family of the *Ratcliffs*, now the Lords of *Darwent-water*, who have in Poſſeſſion the *Mannor* and *Lordſhip* of *Keſwick*. The *Fiſh* bred in this Water are *Pikes*, which feeding upon the other kinds of *Fiſh*, deſtroy their Increaſe. The River running through it is *Darwent*. *Keſwick-water.*

The third remarkable *Lake* is called *Baſſenthwait-water*, ſome Miles in length, and in ſome places near half a Mile in breadth. The *Fiſh* bred in this Water, are *Baſts*, a bony *Baſſenthwait-water.*

bony ſort of *Fiſh*, yet when baked in Pots, the Bones all diſſolve. The River running through it is *Darwent.*

There come every Year a Number of *Swans* to *winter* upon this Water, and in the *Spring*, they breed upon the little *Iſlands* in the Water, or in the *Sedge*, growing by the ſides of it; and as ſoon as the young Brood gets wing, the old ones carry them into the *Southern* Rivers.

Buttermor-water.

The fourth remarkable *Lake* is *Buttermor-water*, wherein is bred a ſort of *Fiſh* called *Charrs*, much like the *Ulls water Trout*; the *Male* is grey, the *Female* yellow bellied; the Fleſh upon them is *Red*, and *Criſp* to the Taſte. They are more luſcious and delicious than the *Trout.* They are in this Country baked in Pots, well ſeaſoned with Spices, and ſent up to *London* as a great *Rarity.* In ſome places this Water is ſo deep, that the Bottom cannot be found, either by *Diving* or *Plumming.* The Water running through it is ſo inconſiderable, that it hath neither got the Name of *River* nor *Rivulet.* Theſe *Charrs* are a Fiſh bred in this Water, and are peculiar to it and *Windermer-water.*

Theſe *Mountains* have their Names and Diſtinctions from the next *adjacent* Town, or from the Mannor and Lordſhip they belong to, as *Matterdale*, *Patterdale*, *Ridall*, *Cunningſton*, *Langdale*, *Borrowdale*, *Newland*, *Keſwick*, and *Threlkeld Fells* or *Mountains.*

The *Mineral* Productions of all theſe Mountains are *Lead, Copper*, and *Iron*; there is no Proſpect of *Coal*, either upon theſe *Mountains*, or their *Heaths*; for where there are no flat and pinguid *Strata*, there can be expected no *Coal*, as hereafter, in its proper place, will be more particularly obſerv'd. *Langdale* and *Cunningſton* Mountains do abound moſt with *Iron Veins*; which ſupplies with *Ore*, and keeps conſtantly going, a *Furnace* at *Langdale*; where great plenty of good and *malleable Iron* is made, not much inferior to that of *Dantzick*. *Note.*

The great Copper-Work at Keſwick.

In the beginning of Queen *Elizabeth's* Reign, there was erected a *Copper*-Work near the Town of *Keſwick*, the moſt famous at that time in *England*, and perhaps in *Europe.* The *Operators*, *Managers*, and *Miners*, were moſt of them *Germans.* The chief *Steward* of the Work, was one *Heckſteter*, who, by his Books of Accounts, which are moſt regular and exact, and all in large Imperial *Paper*, as well as by other Writings I found under his Hand, appears to have been a Man of great Learning, as well as Judgment in *Metals* and *Minerals.*

The Copper *Ore* which kept theſe large *Furnaces* at conſtant work, was, for the moſt part, got in the *Veins* upon *Newland*

Mountains, the Royalty whereof did then belong to the Earl of *Northumberland*, and is now in the Poſſeſſion of his Grace the Duke of *Somerſet*, who having married the moſt Vertuous and Noble Lady *Elizabeth*, Daughter and Heireſs to the Earl of *Northumberland*, intitled himſelf to the *Peircy*'s Eſtate.

I find that ſome ſmall quantities of *Ore* were got upon *Caldbeck* and *Cunningſton* Mountains, and brought to the great Work at *Keſwick*, being a place moſt convenient, both for *Water* and *Coal*, which they had from *Bolton Colliery*; the Royalty whereof belonged to the Earls of *Northumberland*, and is now in the Poſſeſſion of the Duke of *Somerſet*.

Newland *Veins.*

In our Survey of the Mountains of *Newland*, we found eleven *Veins* opened and wrought by the *Germans*; all diſtinguiſhed by Names given them, as *Gowd-Scalp*, now *Gold-Scalp*, *Long-Work*, St. *Thomas*'s *Work*, &c. of all which *Veins*, the richeſt was that they called *Gowd-Scalp*. We found the *Vein* wrought three Yards wide, and twenty Fathom deep above the grand *Level*, which is driven in a hard *Rock* a hundred Fathom, and only with *Pick-Axe*, *Hammer*, and *Wedge*, the Art of Blaſting with *Gun-Powder* being not then diſcovered. For ſecuring of this *Rich Vein*, no Coſt of the beſt *Oak-wood* was

Gold-Scalp *Vein.*

was ſpared; and for the recovering of the *ſoles* under *Level*, was placed a *Water Gin*, and Water was brought to it in Troughs of Wood upon the tops and ſides of high Mountains, near half a Mile from the *Vein*.

The *Ore* at the top of the *Vein*, which appeared by day-light, was *ſulphurous*; but in ſinking deeper, the *Vein* got more Moiſture, and the *Ore* improved in Goodneſs.

The *Ore* got by the *Gin* under *Level* was ſo rich in *Silver*, that Queen *Elizabeth* ſued for it, and recovered it from the Earl *Peircy* for a Royal *Vein*.

Moſt, of the moſt Judicious *Miners* and *Chymiſts* in *England*, were concerned in the Tryal, either as of the *Jury*, or *Evidence*. The Verdict was given for the Queen; and as the *German*-Books give Account, a hundred Tun of *Ore* was entered upon by the Queen's Agents. This rich *Vein*, and ſeveral more in the Mountains of *Newlands*, are now laid open and recovered by his Grace the Duke of *Somerſet*; and likewiſe *Smelt*-Houſes, *Furnaces*, and all other Conveniencies are made ready by his *Grace* for ſetting forward a great Work.

It may be preſumed that the diſcouragement his Grace met with, which at preſent hath put a ſtop to ſo noble a Project, was his meeting with an Ignorant *Operator*, who underſtanding not the Nature of the *Ore*, burnt and deſtroy'd fifty Tun of the beſt *Gold-Scalp Ore*, without the Production of one Pound of fine *Copper*.

CHAP. XI.

Of the Art of Calcining *and* Refining *ſuch* ſulphurous Copper Ores, *as are got in the* Mountains *about* Keſwick *and* Newlands; *ſo that the* Sulphur *does not burn and deſtroy the* Metal.

ALL Copper *Ore* that is ſhining is *ſulphurous*; it's the *Sulphur* that gives the ſhining *Complexion*.

Tho' the *Ore* that's *Blue*, *Green*, or *Brown*, yields much *Copper*, and requires leſs Art and Labour in the Operation; yet, the *Yellow* ſhining *Ore* produceth a finer and more ſilvery *Copper*; which will appear in the Produce, if, in its Operations, it be artificially managed to the beſt Advantage; for by giving of *ſulphurous Ore* too quick a Fire, either in *calcining*, or in *melting* of it down into a *Regulus*, the *Metal* preſently exhales and flies out with the *Sulphur*, and nothing is left but a burnt *Slag*.

The Method we uſe then in our Operations of ſhining *Ore*, is firſt *calcining* of it, when broken by the *Stampers*, into ſmall pieces of the bigneſs of *Cockles*. The *calcining* Fire muſt be low, and the *Ore* muſt 1.
continue in it 'till the blue Flame be quite ſpent and gone off. When the *Ore* is taken 2.
out of the *Furnace* and cooled in cold Water, we put it the ſecond time under the *Stampers*, and break it as ſmall as *Hazel Nuts*; and then put it into the great *Furnace*, where we let it lie ſweating in a ſoft and ſlow Fire the ſpace of twenty four hours, until the taſte and ſmell of *Sulphur* be quite gone off: Then we raiſe the Fire, and as ſoon as the 3.
Ore is throughly flowed, we preſently Tap the *Furnace*, and give the *ſulphurous Slag* no time to feed upon the *Metal*, or mix with it in the *Furnace*. As ſoon as the *Metal* and 4.
the *Slag* are *coagulated* and *hardened* in the *Sand* we *Tap* it into, we cool it again in cold Water, and the *Regulus* is eaſily ſeparated from the *Slag*. This is the ſecond *Operation*.

After this, we put the *Regulus* under the *Stampers*, and beat it as ſmall as Meal, and put it again into the great *Furnace*; and when it's well flowed, we cool the Fire a little, and skum the *Regulus*; and if it appear in the *Furnace* of a *greeniſh* Colour, this we call courſe *Copper*, which is not as yet *Malleable.* This is the third *Operation.*

After this we put the courſe *Copper* into the refining *Furnace,* and when it is well melted down, we let it continue Purging and Refining it ſelf from the *Droſs,* until, upon Tryal, we find that it has got its natural Colour; then we Tap it, and if it be not Note. *Malleable* we put it into cold Water; for as cold Water hardens hot *Iron,* ſo cold Water ſoftens hard *Copper.* This is the fourth, and commonly the laſt *Operation* that is required for bringing *ſulphurous* Ore into fine *Copper.* Note. *Note,* That this kind of ſhining *Ore* requires no Flux to make it flow; and to Flux it with *powdered Pit-Coal,* (as I have ſeen done by Ignorant *Operators)* is to add *Sulphur* to *Sulphur,* which quickly burns up and deſtroys the *Metal.* This Method was practis'd by that Eminent Operator in *Copper,* Mr. *Middleton Shaw,* in his Tryals made of his Grace the Duke of *Somerſet's Ores* got in *Gold-Scalp Vein,* the *Long-Work Vein,* and other *Veins* in *Newlands* Mountains.

CHAP. XII.

Of the Generation, Growth, *and* Tranſmutation *of* Metals, *&c.*

THERE is no *Phænomenon* in Nature that hath more exerciſed the Heads of the Learned, and about which their Opinions are more different, than the *Generation*, *Growth*, and *Tranſmutation* of *Metals*, and this affords us no great Matter of Wonder; ſince the *Author* of *Nature* ſeems to have created them in that *Obſcurity* and *Depth*, and to have immured them in hard *Rocks*, on purpoſe to hide their Cauſes, and to give a *Check* to the Ambition of Man.

The Philoſophers, who pretend to ſearch into the Cauſes of Things, beſides the firſt *Matter*, which is the firſt *Principle*, (not only of *Metals*, but of all other Bodies in the World) have aſſigned another *Matter*, but remote alſo; and this is a certain moiſt, unctuous *Exhalation*, together with a Proportion of thick and tough *Earth*, from which (being mingled together) reſults a *Matter*, whereof not only *Metals*, but alſo *Stones*, are made; for if the *Dryneſs* prevails, Stones are made; but if the unctuous Humidity be predominant, then Metals are generated.

nerated. Of this Opinion was *Plato*, *Ariſtotle*, and their Followers.

From the abundance of this pure and ſhining Moiſture made Solid, proceeds the luſtre of *Metals*; in whom, of all the *Elements*, Water is known to be moſt predominant; and for this Reaſon it is that they flow, and are diſſolved by *Fire*.

From the various Temperament and Purity of the aforeſaid *Matter*, come the divers kinds of *Metal*, the moſt pure and perfect of all which is GOLD, being, as it were, *Nature*'s principal Intention.

Many, to avoid difficult Diſputes of this Nature, are of that vulgar Opinion, that at the *Creation* of the *World*, God Almighty made all the *Veins* of *Metal* in the ſame Condition as we now find them. This *Hypotheſis* ſeems to give an affront to *Nature*, in denying her a productive Virtue in this, which is allowed her in all *ſublunary* Things. Beſides, Experience hath manifeſted the contrary, for a clear and evident Example of which we have in *Ilva*, an Iſland adjoining to *Tuſcany*, a place full of Iron *Mines*; in which, when the *Miners* have digged as deep as they well can, they ſuffer the *circumjacent Earth* to fall in, and fill up the Works, and in the ſpace of fifteen or twenty Years, this *metallick Earth* will, by the virtue of the mineral Spirit, be tranſmuted into *Iron*, and the *Miners* will work it over again.

Yet notwithſtanding that this Objection from Experience ſeems to deſtroy this vulgar *Hypotheſis*, it's more probable and agreeable with Reaſon than that new *Hypotheſis* ſo ſtiffly maintained by ſome of our learned *Virtuoſi*, who aſſert, that in the *Antidiluvian Earth* there were no *metallick Veins* of *Ore*, but what were in ſmall *Corpuſcles*, intermix'd with the *ſolid Strata*; which, as it is inconſiſtent with the Account which *Moſes* gives of *Tubal Cain*, who was the firſt, we read of, who wrought both in *Braſs* and *Iron*, and that long before *Noah*'s Flood; ſo it cannot be imagined that the Flood ſhould change the whole Frame and Figure of the Earth; as if God, not liking the firſt moulding of this Earth, would mould it over again.

The *Chymiſts*, who make it their Buſineſs to *Anatomize* the Mixtures of compounded Bodies, and to reduce them to their firſt Principles, do affirm, That all *Metals* are generated of *Sulphur* and *Quickſilver*, and that from the different Proportion of their Mixtures, and greater or leſſer Purification, reſults the difference that is found in *Metals*.

I am the more confirmed in this Opinion, becauſe in all the *metallick Veins* we open, we find more or leſs of *Sulphur*; and tho' *Quickſilver* be not diſcernable in the *Ore*, yet the Effects of it are found by thoſe that labour in the *Veins*, and eſpecially in the *Fumes* where the *Ore* is melted; beſides, there is no Metal, but more or leſs of *Quickſilver* may be extracted out of it.

There are ſome alſo who pretend to underſtand ſo much of the Nature, and Operations of the *Planets*, that they can Calculate Nativities, Prognoſticate the Events of *War*, and gueſs at the Cabinet Councils of Princes; would have the *Sun*, *Moon*, and the reſt of the *Planets*, by their Cœleſtial Heat and Moiſture, to join in the Generation of Metals; whereas, common Experience tells us that the warm Influence of the *Sun*, which is the *Primum Calidum* among the Planets, never penetrates farther than ten Foot into the Earth, and that the greateſt Rains ſeldom moiſten the Earth deeper than the Surface-Soil.

Again, Experience further aſſures us, that the deeper we ſink down into the Bowels of the Earth, the *ſubterraneous* Heat and Moiſture increaſeth; and we find all *Minerals* and *metallick Ores* in higher degrees of Perfection.

But it's generally agreed upon by all *Philoſophers*, *Chymiſts*, and *Aſtrologers*, that in all Generations, there muſt be two Principles,

ples, *(viz.)* one of Activity, which we call the formal and efficient Cauſe; the other of Paſſivity, which is the material Cauſe.

The efficient Principle muſt then be a mineral Virtue or Spirit, which pervades the whole Body of the Earth; and where-ever this mineral Spirit meets with Matter modified and prepared for its Reception, it unites and mingles with it, and falls a working: It ſerves its ſelf with *Heat* and *Cold*, as its Inſtruments, which are not *Elementary* Qualities, as *Philoſophers* conceit, but real *Entities*, and the two Hands of Nature, by which all its Operations, as well in the Bowels of the Earth, as in the *Atmoſpherial* Regions, are effected, as we have obſerved in our Preliminary Chapter of *Heat* and *Cold*. The Office which the *ſubterraneous Heat* performs in all Generations, as well as Metals, is to mingle uniformly the earthy and humid Parts together; and then to boil, digeſt, and thicken that Matter; and the Cold coagulates and hardens it ſo, that it puts on the form of this or that *metallick Ore*; and is more or leſs perfect, according to the preſent Modification of that Matter, when the *mineral Spirit* began to actuate and inform it. Hereupon is grounded the Opinion of ſeveral *Philoſophers*, who affirm, that there is only one kind of perfect Metal, which is GOLD, and that all the others we call ſo, are only Principles and Gradations to it; and therefore they conceive it poſſible by Art, to reduce them to Perfection: And this *Hypotheſis* hath occaſioned ſo much Labour and Study to find out the *Philoſopher's Stone*, which will *tranſmute* all the *imperfect Metals* into the Perfection of GOLD.

They who oppoſe the poſſibility of ſuch Tranſmutations, place the force of their Arguments in proving, That the ſeveral Species of Metals, as *Copper*, *Lead*, and *Iron*, are perfect in themſelves, and diſtinct one from another.

But their Reaſon convinceth not; and if it were granted, the Inference would not follow, for we ſee like *Tranſmutations*, and far more difficult, performed both by Art and Nature.

By Art, *Waſps* and *Beetles* are made of the Dung of Animals, and ſeveral kinds of *Inſects*; and it is notoriouſly known, that in *Scotland*, of pieces of Ships, and Fruit that falls into the Sea, are generated *Living Ducks*; beſides, there are petrefying Waters that will *tranſmute* Moſs or any porous Matter that will ſuck in the Water, into ſolid and perfect Stone, as we have already obſerved.

And in Metals, it's evident that by the *Spirit of Vitriol*, (as we have ſaid) *Lead* and *Iron* may be turned into fine *Copper*; and in the

Nouriſhment of all living Creatures, there is a continual *Tranſmutation.* And notwithſtanding that the ſame Definition agrees not with *Copper*, *Lead*, and *Iron*, as well as with *Gold*, we cannot thence conclude, that they differ ſpecifically, becauſe ſome may be perfect as *Gold*, and the other imperfect, as all the other within the ſame Species of *Metal*; ſo a Man and Child hath the ſame eſſential Definition, but a Child is not a Man 'till grown up to the Age and Perfection of a Man. Beſides, we meet with in the Veins of the Earth, ſeveral *Semi-minerals*, which, like *Abortions*, are ſometimes, by the Covetouſneſs of Mankind, torn from the Bowels of the Earth before they come to their full Time of Maturity.

Sometimes alſo we meet with *Semi-minerals* in rich *Veins*, wherein the *Ore* ſeems to be at its full Growth and Perfection; and to me they appear as if they were the *excrementitious Superfluities* of *Generation.*

Having now given you the Opinions of others concerning the *Generation*, *Growth*, and *Tranſmutation* of *Metals*, I ſhall proceed to the next Chapter, which will entertain you with the Nature of *Mundicks.*

CHAP. XIII.

Of Mundick Metals, *but more eſpecially of* Black-*Lead, or* Wadd; *its Nature and Uſes*, &c.

IN the Mountains of *Newlands*, we meet with ſeveral *Veins* of *Mundick Metal*, which conſiſts of *Tin* and *Copper*, ſo mix'd and incorporated, that their different Species cannot be diſcerned in the *Ore*, which is of a *grey* and ſhining Complexion.

This *Ore* having much *Sulphur* in its Compoſition, flows eaſily, and yields near half *Regulus* white, and promiſing; but the different *Metals* can neither be ſeparated, nor reduced to a malleable Temper.

This ſeems to be a natural *Bell-Metal*, which is a mixture of *Tin* and *Copper*; and if this *Mundick Metal* were artificially Refin'd and Temper'd, it might in all probability be made as uſeful, and of equal Value with the artificial Mixture.

In theſe *Mountains* we have ſeveral other *Mundick Veins* of *Copper* and *Iron*, of *Lead* and *Antimony*, mingled in the ſame *Ore*, but can neither be (by any Art we have) either *ſeparated* or made *malleable*.

Wadd *and* Black-Lead.

The moſt remarkable *Mundick Vein* upon theſe *Mountains*, is that we call *Wadd*, or *Black*-Lead.

This *Vein* was found upon *Borrowdale* Mountains, near *Keſwick*, and there is not any other of the ſame kind in *England*, nor perhaps in *Europe*, at leaſt that I ever heard of.

Its Compoſition is a black, pinguid, and ſhining Earth, impregnated with *Lead* and *Antimony*. This *Ore* is of more Value than either *Copper*, *Lead*, or *Iron*.

Its Uſes. Its natural Uſes are both *Medicinal* and *Mechanical*. It's a preſent *Remedy* for the *Cholick*; it eaſeth the Pain of *Gravel*, *Stone*, and *Strangury*; and for theſe and the like Uſes, it's much bought up by *Apothecaries* and *Phyſicians*, who underſtand more of its *medicinal* Uſes, than I am able to give Account of.

The manner of the Country Peoples uſing it, is thus; Firſt, they beat it ſmall into *Meal*, and then take as much of it in white Wine, or Ale, as will lie upon a *Sixpence*, or more, if the Diſtemper require it.

It operates by *Urine*, *Sweat*, and *Vomiting*. This Account I had from thoſe who had frequently uſed it in theſe Diſtempers with good Succeſs; beſides, thoſe Uſes that are *Medicinal*, it hath many other Uſes, which increaſe the Value of it.

At the firſt diſcovering of it, the Neighbourhood made no other uſe of it, but for marking their *Sheep*; but it's now made uſe of to glazen and harden *Crucibles*, and other Veſſels made of *Earth* or *Clay*, that are to endure the hoteſt *Fire*; and to that end it's wonderfully effectual, which much inhaunceth the Price of ſuch Veſſels.

By rubbing it upon *Iron-Arms*, as *Guns*, *Piſtols*, and the like, and tinging of them with its Colour, it preſerves them from ruſting.

It's made uſe of by Dyers of *Cloath*, making their *Blues* to ſtand unalterable; for theſe and other Uſes, it's bought up at great Prices by the *Hollanders*, and others.

The *Lords* of this *Vein*, are the Lord *Banks*, and one Mr. *Hudſon*. This *Vein* is but opened once in ſeven Years, but then ſuch quantities of it are got, that are ſufficient to ſerve the Country.

This Mundick *Ore* having little of *Sulphur* in its Compoſition, will not flow without a violent Heat. It produceth a white *Regulus*, ſhining like *Silver*. It cannot be made *malleable.*

CHAP.

CHAP. XIV.

How to diſcover Mines *of* Coal, Veins *of* Copper, Lead, Iron, *&c. by their upper Covers and adjoining* Strata, *as we diſcover* Nuts, *and other Fruits by their* Husks, Shells, Leaves, *and outer* Coats.

ALL Mines of *Coal*, *Lead*, *Iron*, *Copper*, &c. have their natural Poſition in the *Earth*, either upon Flats, or in *Veins*.

Coal always lies in flat Seams, having an *Horizontal* Depreſſion, which the *Miners* term *Dib* and *Riſe*.

And thus Providence hath been pleaſed to order it, that all the *Mines*, and thoſe ſolid *Strata*, which are their natural *Covers*, ſhould (for the Eaſe and Benefit of Man) have a natural *Riſe* to the *Surface* of the *Earth*, that, by their breaking out upon the Precipices of *Mountains* and *Hills*, or by the ſides of *Rivers*, the *Miners* might be incouraged to make their Tryals with great Advantage; whereas, if the *Mines* and *Strata* of the Earth had laid upon a flat *Level*, there would have been no breaking out, or outward Diſcoveries, either of *Coal*, *Mine*, or *Mineral*, but the *Miners* would have been forced to make their Tryals by *Gueſs*, or at *Hazard*.

All Seams of *Coal* have their proper and peculiar *Claſſes* of *Strata* or *Covers*, belonging to them; and if any unskilful *Miner* ſhould make Tryals for *Coal*, without the Limits and Bounds of this *Claſs*, he would undoubtedly loſe both his Labour and Money.

Seams of *Coal* lie ſeldom upon the Tops of high *Mountains*, but upon the *Mountain* Heaths, where the *Declivities* and *Inequalities* of the Surface give advantage to drive *Levels* for draining their *Feeders:* Thus Nature hath ordered all Things for the Benefit of Man, and to encourage his Induſtry.

The uſual *Covers* of *Coal*, lying upon the *Skirts* of *Mountains*, are *Beds* or *Layers* of black *Chivers*, yellowiſh *Free-ſtones*, *Lime-ſtones*; and next to the *Coal*, there commonly lies a grey *Free-ſtone*, ſpangled with *Sulphur*, which changeth into a *bituminous Plate*, which is the Roof and Support of the *Collieries*.

Seams of *Coal* commonly lie upon the *Sea-ſide* of the *Mountains*, as in *Northumberland*, and the adjacent Counties; the *God* of *Nature* having not only provided *Fuel* ſufficient for thoſe and the *Inland* Counties, but convenience for the Exporting the *Overplus* to ſupply the Wants of other Countries.

And it is worth our Obſervation, that in the coldeſt *Climates*, *God* hath provided for the *People* inhabiting there, the greateſt plenty of *Fuel*, either of *Wood*, *Peat*, or *Coal.*

Thus every *Country* hath ſomething in Perfection, which other *Countries* want; and this the *Divine* Wiſdom hath ordered for the Encouragement of *Trade*, and that there might be a Communication of one *Nation* with another, round the whole *Globe* of the *Earth.*

In ſome of the *Inland* parts of the *Country*, the *Coal-Covers* differ from thoſe on the *Mountain* Heaths, being of a whitiſh *ſoapy* kind of *Earth*, which the *Miners* call *Coal-Metal*; and where-ever we meet with this in our *Sinking*, we never miſs of *Coal*; under this white *Metal*, comes in a *beddy Free-ſtone*, which is always of a *grey* Colour, and changeth to a *black bituminous Slate*, which is the *Cover* of the *Coal.* Theſe are the *Coal Covers* upon *Bolton-Paſture* in *Cumberland*; for *Lead*, *Copper*, *Iron*, &c. have their Generation in the *Veins* of the Earth, which run through the great Bodies of *Mountains*, and are the principal Receptacles of its *Heat* and *Humidity.*

Theſe larger *Fiſſures* of the Earth, and eſpecially of the *Mountains*, run down either perpendicularly or ſloaping (which is more uſual) from the *Horizon.*

Thoſe *Veins*, or *Fiſſures*, which run parallel between the *flat Sills*, without any conſiderable *Depreſſion*, we call *Flats*, and the *Ore* contained in them *Float-Ore*.

When the *Vein* opens wide in ſome place, and again cloſeth, or as the *Miners* ſpeak, *Twitcheth at both Ends*, this is called a *Belly of Ore*, or *Pipe-Ore*, and is no natural *Vein*.

The *Miners* are very curious to know which way the *Vein* runs upon a *Vertical Plain*, as being certain Signs of the greater or leſſer Riches.

Thoſe *Veins* that run *Eaſt* and *Weſt*, are by all eſteemed the richeſt; and I am the rather confirmed in this Opinion, by obſerving that all thoſe rich *Veins* of *Lead*, eſpecially in the *Northern* part of *England*, run *Eaſt* and *Weſt*, or incline to thoſe Points.

Some, who pretend to underſtand the *Natures* and *Differences* of *Metal*, would have *Lead* and *Iron* to be of the ſame Nature with *Copper*, and that they only differ in the degrees of *Siccity* and *Humidity* in their Compoſition: And by this Affinity of Nature, it is, by the *Spirit*, or *Oil* of *Vitriol*, that both *Lead* and *Iron* may be tranſmuted into fine *Copper*; and to confirm this *Hypotheſis*, we obſerve that the adjoining *Sills*, or *Strata* of *Copper*, *Lead*, and *Iron*, are much of the ſame kind of *Grit*.

Having given Account of the ſeveral kinds of *Veins*, their natural and accidental Poſitions in the Earth, I proceed to ſhew the *manner* how theſe *Veins* may be diſcovered.

And that is either by Art or Fortune; ſometimes violent Currents of Water waſh off the *outer Coat* of the Earth, and leave the *Vein* naked, and open to the Eye. 1.

Sometimes *Veins* are diſcovered by great pieces of Rocks or Cliffs falling down from the Tops and Sides of high *Mountains*, having ſomething of *Metal* in them. 2.

Sometimes rich *Mines* of *Coal*, and other *Minerals*, have been diſcovered by the Plough. 3.

Lucretius was of Opinion, That thoſe *Vulcano's*, or burning Mountains of *Ætna*, *Veſuvius*, and the like, did firſt diſcover to the World, the Nature of *Metals*, by melting them, and making them run out of the *Rocks* and *Veins* wherein they lay conceal'd, into the Form they are now known in: But much leſs Diſcoveries than theſe, have been ſufficient, when Fortune has had a mind to diſtribute Riches to her Favorites. 4.

Beſides, thoſe *Veins* that are diſcovered by Chance, or good Fortune; there are other Diſcoveries made by Human Art and Induſtry.

The *colour* of the *ſuperficial Earth* is no ſmall Indication, whether or no there be *Metals* in the Bowels of it, as hath been ſaid in the third Chapter. 1.

2. Sometimes when *metallick* Stones are found at the bottom of the *Mountains*, the Induſtrious *Miner* traceth them up to the place from whence they were broken off, and there begins to dig, or croſs-cut for the *Vein*.

3. The breaking out of Springs of Water, is a good ſign that the *Vein* is near, eſpecially when the Water diſcoloureth the *Earth* and *Stones* with a *yellowiſh* or *cankered Colour*.

4. When *Trees*, *Shrubs*, or *Plants* grow in rows, as if they had been ſet by a Line, oftentimes it proves that a *Vein* of *Metal* runs underneath them.

The Plants that grow over the *Veins* of *Metal*, are neither of ſo large a Growth, nor of ſo lively a *Colour*, as others of the ſame kind, becauſe the Exhalations ariſing from the *Veins* blaſt them, and hinder their Perfection.

This I have frequently obſerved upon *Newland* Mountains; and for this Reaſon it is, that neither *Dews* nor *Snow* will lie long upon a *metallick Claſs* of Earth; by theſe *Symptoms* and *Indications*, the Ingenious *Miner* hath Encouragement to make his Tryals.

Having now ſhewn the natural Poſition of *Veins*, which are the *warm* and *humid Matrixes*, wherein all *metallick Ores* have their Generation and Growth, I ſhall proceed to make an Inquiry, whether, in theſe two Counties of *Cumberland* and *Weſtmorland*, any *precious*, or *Stones* of an *extraordinary* Value may be found, which the following Chapter will give Account of.

CHAP. XV.

Whether there be Precious Stones, *or* Stones *of a* conſiderable *Value, to be found in theſe two Counties.*

I Have already laid it down as a probable *Hypotheſis*, That all *precious Stones* are either the *External Gums* and *Exudations* of *Stones* of a *metallick* Nature, or the *Internal Kernels* of ſuch; as the *Magnet* in *Iron Veins*, or the common *Cat-heads* in *Coal*, or *Lime-ſtone Metals*, or *Chivers*.

And therefore the moſt *precious* and *valuable Stones*, are found in *Veins* of *Gold*, *Silver*, or *Lead*; and theſe *Stones* bear a Value proportionable to the Value of thoſe *metallick Veins*, wherein they are found: And tho' we cannot flatter our ſelves with the Hopes of finding, or making any Diſcoveries of *Veins*, either of *Gold* or *Silver*, in theſe two Counties; yet we have rich *Veins* of *Silvery Lead*, in which we frequently meet with *Stones* richly Imboſſed with Cluſters of *Diamonds*, as bright and ſparkling as any we have from *Briſtol*; and if we had the

Art of uſing them, would be of the ſame Value.

We have alſo in our rich *Lead Veins*, great Variety of *Spar*; ſome white, and as tranſparent as fine *Chryſtal.*

I had ſome by me, through which I could have read the ſmalleſt Characters, tho' an Inch thick.

We have others, *Green*, *Blue*, *Red*, and of a *Violet Colour*, which if they could be ſo ſoftened and mollified, as to be cut into Figures, might be of Uſe and Value.

We have likewiſe in the Rivers *Irt* and *End*, within the Mannor of *Egremont*, *Pearls* got in thoſe large *ſhell-Fiſh* we call *Horſe-Muſſels*, which gaping and eagerly ſucking in their dewy Streams, conceive and bring forth great Plenty of them, which the Neighbourhood gather up at low Water, and ſell at ſmall *Prices.*

Theſe Rivers were Rented by a Neighbouring *Gentleman*, of his Grace the Duke of *Somerſet*, who is now the Lord and *Proprietor* of that antient and large Mannor; but the *Gentleman* dying, his Project ſunk.

The Mineral Productions of this Mannor are *Iron*, with ſome ſmall Seams of *Coal*, which ſeem to be of an agreeable Nature; for in our ſinking for *Coal*, we frequently meet with *Strata* of *Iron* in its upper Covers.

In a place call'd *Langhorn*, within that Mannor, is a *Belly*, or *Pipe* of *Iron Ore*, eight Yards deep, in breadth eighty Yards, and in length a hundred; out of which, ſeveral thouſand Tun were yearly got for many Years laſt paſt; the *Ore* was very rich, conſiſting of *Button-Ore*, and a *pinguid ſhining Ore*. It anſwered to his Grace the Duke of *Somerſet*, a yearly Rent of ſeveral hundred Pounds: The preſent *Leſſees* are the Judicious *Thomas Addiſon*, Eſquire, and Madam *Ann Hebar*.

Being at *Egremont*, his Grace the Duke of *Somerſet* having, of his Goodneſs, given my Son the Rectory of that Church, I had the Curioſity to go to ſee that rich *Vein*, and the Stock of *Ore* upon the Bank, which was like a little Mountain. In that great variety of *Ore*, I did not only meet with *Spar*, as Tranſparent as the cleareſt *Chryſtal*, but *Stones* Imboſs'd with *Baſtard Diamonds*, near as ſparkling as the *Real*.

I alſo found ſeveral of the *Hæmatites*, or *Blood-Stones*, ſome of which I carried up to *London*, and were well approved of, as not inferior to the beſt.

And undoubtedly in that rich *Mine* there were ſeveral *Magnets* ingendered; but theſe *Stones* (which, for their extraordinary Virtues and Uſefulneſs to Man) may deſervedly be reckoned amongſt the *precious Stones*, but being *Opake*, and without *Luſter* or *Shining*, cannot be eaſily diſcovered or diſtinguiſhed by the Injudicious Miners.

Theſe *Magnets* (with Submiſſion to better Judgment) are only the *Pneumatick Kernels*, or *Spirituous Glands* of a rich *Vein* of *Iron*, like thoſe *Cat-heads* we meet with in *Coal-Covers*, or *Lime-ſtone Chivers*, or *Flints* in *Beds* of *Chalk*, to which the Spirits of the Mine concenter; and theſe *Magnets* being removed from their Native *Beds*, emit their *Spirituous Effluvia's*, and attract and draw to their Center, ſuch light Bodies of *Iron*, as come within the Sphere of their Activity, *Iron* being their moſt natural and agreeable *Pabulum*.

And this *Magnetick* attractive Power, is not peculiar to the *Magnet*, but the Root of every *Tree* and Vegetable, by its *plaſtick* Spirit, attracts ſuch Juices, as are moſt agreeable to their Natures; and by concocting and digeſting of them into their own Subſtance, they grow up and encreaſe 'till they come to their full Growth and Perfection.

As for the Poſition of the *Magnetick* Needle, which always points to the *Northern* and *Southern* polar Stars, we ſhall endeavour to give light into that dark *Phænomenon*, in that Chapter which will Treat of the *Power* of *Magnetiſms* and *Natural Inſtincts*.

But before I conclude this part of the *Mineral* Hiſtory, I cannot omit, that in our ſurveying of thoſe high, ſteep, and ſtony Mountains, which are called the *Skrees*, within the ſaid Mannor, we diſcovered near the Top of one of the higheſt Mountains, a *Vein* of *Iron*, which, in the Opinion of the Judicious Mr. *Shaw*, who was the Diſcoverer, was as rich a Proſpect as was in *England*, being within four Miles of *Ravenglaſs*, a Harbour for Ships.

At the Foot of one of the Mountains we found lumps of *green Copper Ore*, which we preſumed were broken off from ſome rich *Vein* of *Copper* upon the Top of the Mountain.

The Mountain whereon we diſcovered the *Iron-Vein*, being ſo very ſteep, I durſt not climb up to it, but ſent my Son to ſee it, who gave me the ſame Account with Mr. *Shaw*. They brought me down out of the *Vein*, the ſeveral kinds of *Ore* it contained, as *Button-Ore*, *Stony-Ore*, and a ſoft *greaſy Ore*. Theſe I carry'd up to *London*, where they were try'd, and well approv'd of.

Theſe Diſcoveries may be of great Advantage to the Duke of *Somerſet*, the Lord of the Royalty; and therefore I would not have them over-look'd by thoſe who (perhaps) hereafter may make themſelves the Authors of theſe Diſcoveries.

As the *Interior Strata* of theſe Counties are rich in *Metals*, the Rivers rich in *Fiſh*, ſo the *External Surface* is productive of as great Variety of *Plants* and *Vegetables*, a Catalogue of which we have hereunto annexed.

A
LIST
OF

Several rare PLANTS, (not obſerved by Mr. *Ray*,) found in the Mountainous Parts of the Counties of WESTMORLAND and CUMBERLAND, by the late Eminent Botaniſt Mr. *Thomas Lawſon*; and by him noted on the Margin of the ſaid Mr. *Ray*'s Catalogue of *Engliſh* Plants, now in the Poſſeſſion of (his Daughter) Mrs. *Thompſon* of *Farmanby*.

ALSINE Becaburgæ folio, Moriſoni. *Chickweed*, with the Leaves of common *Brook-lime*; as deſcribed by Dr. *Morriſon* of *Oxford*, very frequent.

Anonis Spinoſa, flore Albo. The prickly *Reſt-harrow* (uſually Purple) with a white Flower. On ſandy Hillocks near the Sea-ſhore.

Armeria (ſive Caryophyllus) pratenſis, flore Albo. White flower'd *Meadow-Pink.* This was obſerv'd near *Orton* in *Weſtmorland*; and growing in the like marſhy Grounds, with the Common, cannot be ſuppos'd to be only a Variety, and not a diſtinct *Species.* The ſame perhaps may be ſaid of the forementioned *Anonis.*

Bifolium Paluſtre, tribus foliis. Three-leav'd *Tway-blade.* This was firſt found in the *Low-Hag*, over againſt the Mill at *Great Strickland.* But he afterwards met with it in ſundry other places of the Neighbourhood, as likewiſe elſewhere in the County of *Weſtmorland.*

Cannabis Spuria, flore albo magno & elegante. Wild Hemp, with a large and beautiful white Flower. This was firſt obſerv'd, as an extraordinary Rarity, by Dr. *Merret*, in the Foreſt of *Sherwood*, and other parts of *Nottinghamſhire*: It grows plentifully on the Skirts of *Croſs-Fell*, and other places within both theſe Counties.

Cardamine flore pleno. Double flower'd *Lady's Smock.* This grows commonly enough on the Paſture Grounds near *Little Strickland*; and 'twas elſewhere found with no leſs than eight Rows of *Petali.*

Caryophyllata, flore amplo purpureo pleno. Double flower'd *Herb-Bennet*, with a large and purple Flower. This comely Plant was ſent by the Diſcoverer (Mr. *Lawſon*) to Mr. *Ray*; who acknowledged it to be hitherto undeſcrib'd, and therefore beſtow'd upon it the following Deſcription, *Caryophyllata purpurea prolifera, quadruplici aut Quintuplici ſerie petalorum; è medio floris emergit caulis, florem in ſummitate gerens octodecim petalorum.*

Cotula non fœtida, flore pleno. Double flower'd *Dog's Camomile*. This Rarity, with four or five Ranks of Flowers, was met with in the Diſcoverer's own Grounds at *Great Strickland.*

Equiſetum Nudum variegatum minus J. B. the naked and party colour'd *Horſe-Tail* of *John Bauhinus*. This was firſt ſhew'd to Mr. *Lawſon* at *Great Salkeld*, but grows in ſo great plenty there, and every where on the Banks of the River *Eden*, that he could not but wonder that this was the firſt time of its being obſerv'd in *England*; 'tis an early, and quickly fading *Vernal Plant*, which might probably be the occaſion of its not being hitherto taken notice of by thoſe Curious Gentlemen, who commonly began their Circuits too late in the Year for ſuch a Diſcovery.

Geranium Batrachoides flore eleganter variegato. Crowfoot, Cranes-bill, with a beautiful party colour'd Flower. A dry'd Sample of this, found in Mr. *Howard's* Park at *Thornthwait*, was ſent to Mr. *Ray*, who (in his Supplemental *Faſciculus* ſoon after publiſh'd) took notice of it as a ſpecial Rarity.

Geranium Columbinum folio malvæ rotundo, flore albo. Dovesfoot, Cranes-bill, with a white Flower. This being obſerv'd ſeveral Years together in good fruitful Ground, under a Wall near the *Round-Table* at *Eamont-Bridge*, the Diſcoverer thought he had reaſon to reckon as a new *Species*; tho' he doubted whether he might boldly ſay the ſame of that which follows.

Geranium Hæmatodes album, venis rubentibus ſtriatum. Bloody *Cranes-bill*, ſtriped with rediſh Veins. The Mixtures in the Common kind (tho' even that is peculiar to thoſe and the like *Alpine* Countries) are quite contrary. This *Variety*, for he ſuppos'd it to be no more, was found on ſeveral ſandy Grounds near *Millum* in *Cumberland*, but moſt plentifully in the Iſle of *Walney*.

Narciſſus Flore albo & albido. The Common wild *Daffodil*, with a white and pale colour'd Flower. The latter of theſe is frequently obſerv'd to grow intermix'd with the Ordinary yellow; but the former was firſt gathered near his own Houſe at *Strickland*, and afterwards near *Ulverſton* in *Lancaſhire*.

Orchis Militaris purpurea odorata. Parkinſon's ſweet purple flower'd Soldier's *Cullions.* This was look'd upon as a choice Rarety, when he firſt met with it, (about the *Fairy Holes)* on *Lancemoor* near *Newby* in *Weſtmorland:* But 'twas afterwards found abundantly in the Meadows upon both the Banks of *Eden*, throughout ſeveral Pariſhes.

Pedicularis Paluſtris elatior alba. The larger Meadow *Lowſe-wort*, or *Rattle*, with a white Flower. This grows pretty plentifully near the Foot of *Long Sleddal*, by the ſide of the common Road, leading towards *Kendale*.

Ptarmica Flore pleno. Double flower'd *Sneeze-wort.* In one of the little Iſlands, call'd *Small Holme*, in the great *Lake* of *Winander-Meer.*

Scabioſa montana maxima Lobetii. The great Mountain *Scabious.* This Plant is well known to be a Native of the *Italian* and *Helvetick* Alps; and Mr. *Lawſon* reaſonably enough concluded from thence, that it might alſo have a ſpontaneous Growth in this Country, when he found it near the Lord *Lonſdale*'s Seat at *Lowther*; but he was afterwards rather inclined to believe (as he confeſſes) that the place where he gathered it, had probably been heretofore a Garden.

Thlaſpi Veronicæ folio Parkinſoni. This is the ſame ſort of *Penny-Creſs*, which *John Bauhinus* calls by the Name of *Burſa paſtoris loculo ſublongo affinis pulchra planta.* It grows on the moiſt ſides of many of our Northern Mountains. Its ſeminal Leaves (which lie next the Ground) are rough, hairy, almoſt round, indented, of a deep green Colour, each on a ſhort foot Stalk, ſomewhat reſembling the Leaves of *Speedwell*; and its Stalk is alſo hairy, half a Foot high, branching uſually from the bottom, though ſometime without Branches. At the Top are many ſmall white Flowers, which are ſucceeded by ſmall long Pods, one above another, Spike-faſhion. In each of theſe there is a ſlender browniſh Seed. The Root is very white and long.

The End of the Firſt Part.

A VINDICATION OF THE *Philoſophical* and *Theological* EXPOSITION OF THE Moſaick Syſtem OF THE CREATION.

WITH
Moral Inferences *and* Concluſions.

By THO. ROBINSON.

Non eſt mortale quod opto.

LONDON:
Printed in the Year, 1709.

A VINDICATION OF THE *Philoſophical* and *Theological* EXPOSITION OF THE *Moſaick Syſtem*, &c.

The Introduction.

AN Ingenious young Divine having lately publiſhed a Treatiſe in Vindication of the Vulgar *Expoſition* of the *Moſaick Hiſtory* of the *Creation*, wherein he ſeems to inſinuate, That all other *Expoſitions*, not agreeable with the *Vulgar* and *Lite-*

ral Senſe, make the Scripture a *Noſe of Wax*; and give Encouragement, not only to *Socinianiſm* and *Deiſm*, but to downright *Atheiſm*.

I muſt for theſe following Reaſons, beg leave of this Ingenious Author to diſſent from his Opinion.

1. And firſt, becauſe moſt of the Learned Interpreters, as well Ancient as Modern, have compared the Holy Scriptures to *Waters*; wherein the *Lamb* may Wade, and the *Elephant* may Swim, *i. e.* ſome Paſſages in the Sacred Scriptures (eſpecially ſuch as concern the neceſſary Rules of Life) lie level with the meaneſt Capacities; whereas, there are other Paſſages too deep for the Profoundeſt Judgments: Among which, we muſt count this of the Creation.

2. Again, much of the Majeſty of the Scripture-Style, which diſtinguiſhes it from all Humane Authority, conſiſts in the *Metaphor* and *Figure*; which does not more ſet off the Beauty, than ſtir Men up to a diligent Search after thoſe Divine *Truths*, veiled under dark and myſterious *Expreſſions*.

3. Beſides, whilſt we continue in this embodied State, our *Soul* takes her Proſpects of

Things without, through Material *Opticks*; hence it is, that we can form no *Ideas* of Abſtract or Spiritual *Entities*, but under Corporeal *Shapes* and *Figures*: And therefore it hath pleaſed the Divine Goodneſs, out of Compaſſion to our Infirmities, to repreſent to us his own Spiritual *Eſſence*, under ſuch Corporeal *Forms*, as are moſt agreeable to our External *Senſes*, and preſent State, (*viz.*) as having *Head*, *Eyes*, *Face*, *Hands*, *Arms*, and other Corporeal Parts, like to our *Bodies*; and likewiſe, as having the Paſſions of *Anger*, *Grief*, *Repentance*, *Love* and *Hatred*, like to the Paſſions of our *Souls*.

Now to underſtand all theſe Paſſages throughout the Scriptures, in a Vulgar and Literal *Senſe*, would diſſecrate the Divine Eſſence, which the whole Humane Race, as well *Heathens*, as *Jews* and *Chriſtians*, have in all Ages believed to be an Eternal Spiritual *Being*, *Omnipotent* and *Omnipreſent*; otherwiſe it would be Folly for Men to ſend up Prayers to a God that is not preſent to hear them, and wants Power to help them in their Neceſſities.

To entertain ſuch mean and vulgar *Ideas* of God and his Divine Perfections, would certainly unhinge the Foundation of all Religion, as well *Natural* as *Revealed*; and not only introduce *Socinianiſm* and *Deiſm*, but

Atheiſm and *Prophaneneſs*, and turn the Sacred Scriptures of God into *Romance* and *Ridicule:* So that to *Vulgarize* and to *Allegorize* the Scripture, are equally of evil Conſequence to Religion; the former making them a common Hiſtory, and the other a myſtical and unintelligible Riddle.

But it is not the Intention of this Treatiſe to Reflect upon any Ingenious Expoſitor; yet foreſeeing that my Opinion concerning ſuch petrefy'd *Shells*, as *Cockles*, *Muſſels*, and other *Marine* Inſects, which we meet with incloſed in hard Rocks, upon the Tops of high Mountains, as well as in Beds of *Sand*, *Gravel*, and *Chalk*, in the Valleys, will be objected againſt by a *Spiteful Virtuoſo*, as being (in his Opinion) inconſiſtent with the Vulgar and Literal Senſe of *Moſes*; I ſhall therefore (to gratify his Scrupuloſity) endeavour to eſtabliſh this *Hypotheſis*, upon ſuch Philoſophical Principles and Expoſitions, as Interpreters of great Learning and good Authority have thought agreeable to the more deep and refined Senſe of that great Maſter; who having the greateſt Advantages of making Improvements in all Sciences, as well *Divine* as *Humane*, we muſt needs have a greater Eſteem and Veneration for his ſhort, but moſt comprehenſive Syſtem, than for the larger Volumes of thoſe common *Hiſtorians* and *Philoſophers* of later date, whoſe Writings are only the Product of their Natural Reaſon, although ſet off with the greateſt Artifice of Words and Advantages of Humane Learning.

The *Birth* and *Life* of this *Great Man*, was all *Miracle* and *Wonder*; and when he dy'd, God interr'd him, and gave him this Encomium, *Moſes my Servant is dead.*

To inſiſt upon theſe in particular, would make a Volume; but my deſign at preſent ſhall be only to give a ſhort Account how *Moſes* came to be qualify'd for ſo great an Undertaking, as to write a *Deſcription* of the *World's Creation*, to be God's Meſſenger to *Pharaoh*, and Captain-General of that mighty Hoſt of the *Hebrews*, which God deſign'd to deliver from the *Egyptian* Yoke.

The firſt *Improvement* which this *Great Philoſopher* made in *Humane Sciences* and *Philoſophical Mythology*, was in *Pharaoh*'s Court, under the Tuition of his own Daughter, who, having no Child of her own, deſign'd to Adopt him her Son, and make him Heir-Apparent to that Crown; and without doubt, ſhe made choice of ſome of the learned *Hierophantæ* to be his Tutors, who were moſt Eminent for their Knowledge in *Philoſophical Mythology*; which is no other, than a more agreeable Vehicle, found out for the conveying to us the Truth and Reaſon of Things through the *Medium* of Images and Shadows.

And hence it is, that the Scripture tells us, *That Moſes was learned in all the Wiſdom of the Egyptians:* Who at that time, and in ſome after Ages, were the moſt Eminent, for obſcuring their profound Notions under *Hieroglyphick Reſemblances.*

And it was moſt certain, that even the wiſe *Men* of *Greece*, diſtinctively ſo called, as well as *Thales*, *Pythagoras*, *Socrates*, *Plato*, and others, borrowed Notions from the *Moſaick* Writings.

Upon this Account it was, that St. *Clement* of *Alexandria* tells us, That the manner and ſtyle in which the *Greek Philoſophers* handled their Philoſophy, was like that of the *Hebrews*, Dark and Ænigmatical.

As for the Writings of the *Old Teſtament*, with all good Men, we adore the *Divine Wiſdom*, which directed the Pen-Men of Holy Writ; and muſt readily acknowledge the Plainneſs and Perſpicuity thereof in the neceſſary Rules of Life, without which it would not have anſwered the Ends of the *Divine Wiſdom* in the Inditing of it. We muſt alſo grant, that whereſoever it is Dark and Abſtruſe, it's far from *Phantaſtry* and affected *Obſcurity*. Hence it is that *Solomon* makes the *Words of the Wiſe, and their dark Sayings*, expreſſive of the ſame thing; and in another place he tells us, that their Diſcourſes were *like Apples of Gold in Pictures of Silver*; that is, beſides the Beauty and Truth in the Out-ſide and Caſe, they had a more rich and precious Meaning within.

Hence it ſeems evident, that the People of the *Jews* had always been trained up in an *Allegorical* way; and they had it in ſuch Eſteem, that they thought no Man fit to Teach that could not handſomly ſhade his Senſe, *Si quis noverit perplexe loqui, loquatur; ſin minus taceat.* And therefore our *Bleſſed Saviour*, in compliance with their mode and way of Teaching, taught the People in *Parables*; and the Evangeliſt ſaith, *That without a Parable ſpoke he not unto them:* And undoubtedly this way of wraping up their Notions under Veils and Figures, they had from *Moſes*, and *Moſes* from the *Egyptians.*

After our *Great Philoſopher* had made theſe Improvements in the *Philoſophick Schools* of *Egypt*, God, by his ſpecial *Providence*, tranſlated him into the Family of his Kinſman *Jethro*, who being as well Prince as Prieſt of *Midian*, did not only diſcipline him in the Art of Policy, Conduct, and Government; by which he was fitted and prepared for being *Captain-General* of that mighty

Hoſt of the *Hebrews*, which God deſigned to deliver from the *Egyptian* Slavery: But it's moſt probable that he inſtructed him in the Religion of his Anceſtors, *(viz.)* the *Patriarchal* Traditions, concerning the Creation of the *World*, the beginning of Things, and the *Genealogies* of Men; which being beſt known to *Adam*, who coming immediately out of God's Hand, did undoubtedly deliver them to his Son *Seth*, *Seth* to *Enos*; and ſo from Father to Son, to *Abraham*, from whom *Jethro* deſcended by a ſecond Marriage: And it is the Opinion of learned Men, that during his Reſidence in *Midian*, which was Forty Years, he writ his Book called *Geneſis*, by the Aſſiſtance of *Jethro* his Father-in-Law.

After theſe Gradations and Improvements, *God* took him into his own Service, and by a ſort of *Perſonal* Conference, communicated to him, as well the manner how all Things came to Exiſt, as how the Manners of Mankind were to be exerciſed; ſo that we may reaſonably ſuppoſe that the *Moſaick* Writings were grounded upon *Divine Revelation*, as well as upon *Philoſophical Principles.*

From what I have advanced upon this Argument, it ſeems Concluſive, That this Short and Comprehenſive Hiſtory of the

Creation, is *Philoſophical* and *Myſtical*, as well as *Hiſtorical* and *Ad Hominem*; for it cannot be imagined, but that ſo great a *Philoſopher* would write after the Mode of the *Schools* from whence he had his Education.

I have now done with the *Preface*, or *Introduction*, and ſhall ſubjoin a *Philoſophical, Mythological Paraphraſe* upon the Firſt Chapter of *Geneſis*, with reference to a late *Vindication* of the *Vulgar Expoſition* of it. And becauſe I would not willingly be thought more definitively *Wiſe* than others can bear or approve of, I ſhall ſubmit ſuch *Philoſophical* Concluſions as I have drawn from the Literal Senſe, to the Judgment of Men of greater Learning and deeper Thought.

And firſt of all, it muſt be allowed by all Good Men, that the *Literal* and *Hiſtorical* part of this Conciſe *Syſtem*, is carry'd on ſo evenly, and conſiſtently one part with another, every thing being repreſented ſo accommodately to the Capacity of the *Vulgar*, eſpecially of the *Jews*, being then bred up in Slavery and profound Ignorance; ſo that according to the *Literal* Senſe, *Moſes* diſcovers himſelf to be a Man of the higheſt *Political Accompliſhments*, as well as *True* and *Warrantable Prudence*.

It muſt alſo be acknowledged, that the *Philoſophical Senſe* contains the nobleſt *Theories*, as well *Theological* as *Natural*, that the Mind of Man, in this dark embodied State, can be entertain'd with; by which *Moſes* appears to be *Maſter* of the moſt *ſublime* and *generous* Speculations that are, or can be contained in the beſt *Syſtem* of *Natural Philoſophy*.

A
Philoſophical, Mythological,
PARAPHRASE
UPON THE
Firſt Chapter of Geneſis.

Verſe 1. *In the beginning God created the Heavens and the Earth.*

IN *the Beginning.*] i. e. when Time firſt commenced; for before the Creation of the World, there was *Duration*, which the School-men call *Stabilis Æternitas*; but Time being an equal Menſuration of Motion, it and Motion commenced together.

God.] the Supream *Being*, uncreated and independent, Almighty in Power, and Infinite in Wiſdom, and all Perfection, was the Efficient Cauſe.

Created.]

Ariſtotle's Hypotheſis.

Created.] *de novo*, out of Nothing; for the Conceit of *Ariſtotle, That this World, with all its Furniture, as it now ſtands, was Eternal*, is to advance the World into an Equality with God; for whatever is Co-eternal with *God*, is *God.*

Plato's Hypotheſis.

The *Platonick Hypotheſis, That the Matter, out of which God made the World, did pre-exiſt*, is to make God an Impotent Cauſe, not able to make this World without Matter and Stuff to work on.

Democritus's Hypotheſis.

To fancy with *Democritus, That the Matter was not only pre-exiſtent and eternal, but that the World had no Efficient Cauſe, but from the caſual Motion of material Atoms, or little Corpuſcles*, is the ſame as if we could conceive that all the Materials of a Noble Palace could of themſelves meet together, and be their own *Architect.*

By Heaven, what is meant.

The Heaven.] i. e. the ſuper-celeſtial Regions, or upper Stories of the *Univerſe*, wherein are the many *Manſions*, where thoſe bright Intellectual *Beings*, thoſe

Morning *Stars*, which *Job* tells us met together and ſung for Joy, do inhabit, and keep their Reſidence; for tho' neither the World, as it ſtands, nor the Matter of which it conſiſts, was Eternal, yet it may be preſumed to be an immediate Conſequent of Eternity, and the natural Emanation of the Divine Eſſence and Attributes, according to that Model and Idea pre-conceived in the Divine Underſtanding.

(*Viz.*) Power, Wiſdom, and Goodneſs.

For it cannot be imagin'd, that the Divine Eſſence would for ſome time ſit ſtill, and wrap up it ſelf in Sloath and Idleneſs, but did always diſplay it ſelf in a vigorous Activity; for the natural Tendency of Infinite Power is Action; of Infinite Wiſdom, is Counſel and Contrivance; of Infinite Goodneſs, Beneficence; we may then reaſonably conclude, that God would, from all Eternity, follow the Inclinations of his own Divine Eſſence.

The Earth.

And the Earth.] i. e. this *Terraqueous* Globe, whereon we live; which was created perhaps ſome Thouſand Years after the Creation of the *Cælum Imperium*; for notwithſtanding that Omnipotent Power might have created the whole World at one ſtroke, by an Imperious *Fiat*; yet it would not have been agreeable with Infinite Wiſdom, which conſiſts in Deliberation and Counſel.

The Angels were fallen from their original State, before the Creation of this Earth.

And it is the Opinion of ſome learned Men, that the Angels having fallen from their firſt Eſtate, God created this *World*, and the *Humane Race*, to inhabit upon it, with an Intention that Human Nature ſhould fill up the Number of fallen Angels.

Ver. 2. *And the Earth was without form, and void, and Darkneß* was *upon the Face of the Deep; and the Spirit of God moved upon the Face of the Waters.*

The State of the Chaos.

The Diviſion of the Chaos.

This Earth, when it was in its *Chaotick* Condition, was only a confus'd *Maß* of Matter, conſiſting of *Solids*, *Fluids*, and *Volatiles*, all jumbled together like that *Egyptian* Fog that was to be felt, and continued in that ſtate until God impreſſed Motion upon the *Chaos*, and then the *Solids* ſubſided, the *Fluids*, being lighter, covered the *Solids*, and ſurrounded the *Globe.*

Light in Maſs.

Whilſt the *Chaos* was in this State, *Darkneſs* was upon the Face of the *Deep*, until the bright *Lucid Æthereal Volatiles* diſintangled themſelves, and formed a Sphere of Light.

Archbiſhop *Sancroft.*

And the Spirit of God moved upon the Face of the Waters.

The *Hebrew* would have it expreſſed thus, The *Spirit of God* ſate on brood upon the Rude Maſs, and by Vital Heats in Incubations, did ſo digeſt and modify the Paſſive Matter, as to make it fit for receiving Life.

Biſhop *Patrick*'s Opinion.

Biſhop *Patrick*, in his Excellent Comment upon the Firſt Chapter of *Geneſis*, is of Opinion, that the *Seminal Principles* of Animals and Vegetables began to be formed then when the *Spirit of God moved upon the Waters*; which, if we take for granted, we may reaſonably conclude, that the Waters were firſt productive of *Animals*; and in the greateſt probability, ſuch Marine Inſects, as *Cockles*, *Muſſels*, *Oyſters*, and innumerable different *Species* of other *ſhell-Fiſh*, which we meet with gene-

My Hypotheſis not inconſiſtent with *Moſes.*

The reaſonableneſs of it.

generated in Sand and Gravel, being not *Loco-motive*, and the firſt Products of the Waters, might be left behind upon the firſt Diviſion of the Waters, and the draining of this Earth; and ſo with the other *ſolid Strata* and *Sediments*, be petrefy'd into a *ſtony Subſtance.*

And this *Hypotheſis* ſeems to be as Rational as, *That they were left behind at the Univerſal Deluge*; and that when the Beds of Iron, Rocks of Marble, Lime-ſtone Flints, and all Solids were diſſolved into a liquid Subſtance, or Hotch-Potch, theſe petrefy'd Shells ſhould keep their Forms, and eſcape that Univerſal Diſſolution.

Ver. 3. *And God ſaid, Let there be Light; and there was Light.*

The firſt remarkable *Phænomenon*, which follow'd this originary Diviſion of the *Chaos*, was *Light*; which, in a Vulgar Senſe, ſignifies no more than a bright ſhining *Illumination*, flowing from the *Æthereal Volatiles*, collected into a Sphere, ſurrounding the *Terraqueous Globe*: But with the *Egyptians*, in their ſacred Characters, *Light* was the *Hiero-*

Hieroglyphick of Life; and Dr. *H. M.* would have Light to be the Platonick *Anima Mundi*, wherein are contained the *Seminal Principles* and *Specifick Forms* of all *Vegetables* and *Animals*; and this ſeems agreeable with the *Moſaick* Hypotheſis, *Gen.* 2. v. 5. *And God made every Plant in the Field before it was in the Earth, and every Herb in the Field before it grew*; they being pre-exiſting in a Vehicle of *Light*, before they were united to their Material Vehicles; and thus *Light* was the *Active* and *Vivifick* Principle of Generation; and it's very probable that *Plato* borrow'd his Notion of the *Anima Mundi* from the *Moſaick* Writings.

The Platonick *Anima Mundi.*

The *Moſaick* Hypotheſis.

Ver 4. *And God ſaw the Light that it was good:*

i. e. That it anſwered the end for which it was created. And that all the Seminal Forms were agreeable to thoſe Shapes, Figures, and Ideas pre-conceived in his own Divine Underſtanding.

And God divided the Light from the Darkneſs.

As *Light* was an Emblem of Life, and the Active Principle in Generation; ſo by *Darkneſs* here is not to be underſtood a bare Privation of *Light*, but that dark Fog of confuſed Matter which God made the Paſſive Principle of Generation: So that the dividing of the *Light* from the *Darkneſs*, may be meant of the dividing the Vivifick Principle of Life, from the Paſſive and Plaſtick Principle of Matter; for it may be very reaſonably ſuppoſed, that Matter and Life were Contemporaries, and that Life was diffus'd thro' the whole Maſs of Matter, which was then ſo Luxuriant and Teaming, that if God had not divided theſe two Principles of *Light* and *Darkneſs*, the Surface of the Earth would not have afforded Nouriſhment for ſo numerous a Brood of Animals as would have been produced.

Matter and Life, Contemporaries.

Life diffuſed through the whole Maſs of Matter.

Hence it is, that we ſee nothing ſo contemptible and vile in this World we live in, but hath its living Creatures, that dwell upon it; the Earth, the Water, the Superior and Inferior Air, the Bodies of Animals, the Fleſh, Skin, the Entrails, the Leaves, the Roots of Vegetables, the Sand upon the Seaſhore, all theſe have their Inhabitants.

The Seminal Forms being by a vital Unition conjoined to their Material Vehicles or Bodies, which the Philoſopher Myſtically repreſents by the figurative Emblems of *Day* and *Night*; the *Evening* and the *Morning* made the firſt Production; for if this were to be underſtood in a Literal Senſe, the Evening and Morning would have made the firſt Night.

Ver. 5. *And God called the light Day, and the darkneſs he called Night: and the Evening and the Morning were the firſt Day.*

The ſeveral kinds of Solids, and other Conſiſtencies of the Earth, being now ſubſided, thoſe of the ſame Nature and Affinity, by an agreeable Juxta-poſition of Parts, and a Secret Magnetiſm, drew together, and ſettled into particular *Claſſes*, every *Claſs* being productive of ſome Mine or Mineral, which is the more *Pneumatick* and Spirituous Part, and the Perfection of that *Claſs*; and were conſolidated, and received their different degrees of Induration and

Ver. 6. *And God ſaid, Let there be a Firmament in the midſt of the Waters, and let it divide the Waters from the Waters.*

Of the dividing of Solids into *Claſſes*.

Digeſtion by the Active Powers of the Subterrene Heat and Cold, together with thoſe petrefying Juices which did then pervade the whole Body of the Earth.

Of the Diviſion of the Waters into *Subterrene*, *Saline*, and *Aerial*, by equal Proportions.

And theſe Claſſes being divided by large *Fiſſures*, and ſmaller *Ramifications*, which dilate and pervade the ſeveral Claſſes, and by Miners are called the greater and leſſer Veins of the Earth; they greedily ſuck'd into the thirſty Matter, the thin and ſweet Water, which then might bear Proportion to a third part of the fluid Maſs.

Another third part being taken up into the higher Regions, by the Attractive Powers of the Ambient Heat and Cold, impleted the Atmoſphere with Air, and a conſiderable part was condenſed into *Clouds*.

The Original of the Sea, *&c.*

The *Salt-water* being the Sediment of the whole Maſs of Fluids, and too thick to paſs through the ſtrait Pores and Strainers of the Earth, began gradually to draw down to its Channels.

All the Veins and Pores of the Earth being now *ſaturated* and fill'd with the tenuous and ſweet Water, the *Subterrene Lymphæducts*, or underground Water-works, began to bubble up and play from the Tops and Sides of the Mountains.

The Original of Rivers.

From whence the Rivers took their firſt *Riſe*, and began to form their Courſes to the *Sea*, and by their Rapidity and Weight, continually preſſing upon her from all ſides, ſwell'd her up into a Gibboſity, and forced her into a conſtant *Flux* and *Reflux*; which Reciprocation of Motion, cauſing in her a boiling Fermentation, the ſweet Water does diſintangle it ſelf from the Salt; and being lighter, riſe up in Fumes and Vapours, 'till they be condenſed into Clouds, and then fall down in ſhowers of Rain, which is the *Succus Nutritius*, that fertilizes the Earth's Surface.

The *Flux* and *Reflux* of the *Sea*.

The Cauſe of Vapours and Clouds.

How the Firmament was made.

The Waters being now divided, there was made a free and open *Expanſion*, which *Moſes* calls the *Firmament of Heaven*; thus the Waters came into a ſettled Circulation, and an Atmoſphere round the Earth was made.

The Waters above the Firmament.

As for the Waters above the *Firmament*, and were without the Sphere of this Earth's Central Attraction, they were attracted to the Moon's Center. See more of this hereafter.

Ver. 8. *And the Evening and the Morning were the ſecond day.*

i. e. They made the ſecond Revolution towards making this Earth an Habitable Globe.

Ver. 9. *And God ſaid, Let the Waters under the Heaven be gathered together, and let the dry Land appear.*

The *Waters* being now divided, and the Saline Waters drawn down to their Channels, the *dry Land* began gradually to appear; firſt, the *Mountain tops*, then their Heaths, then the Plains and Valleys.

But before I proceed, it ſeems neceſſary that I give account of ſuch ſecond Cauſes as the *Almighty Power*, was pleaſed to make uſe of as inſtrumental in all thoſe *Mundane* Productions; and theſe are either *Eſſential* or *Accidental.*

The ſecond Cauſes and the Courſe of Nature eſtabliſhed.

The *Eſſential Cauſes* were the two Principles of *Activity* and *Paſſivity*, or the *Vivifick* and *Plaſtick* Powers.

The *External Cauſes*, were the Active Powers of *Heat* and *Cold*.

The *Accidental Cauſes*, were *Time*, *Motion*, and *Space*.

This being premiſed, we will proceed to the Productions in the Vegetable Kingdom, which was the Work of the third Day.

Ver. 10. *And God called the dry-land Earth; and the gathering together of the Waters, he called Sea.*

And here we cannot but obſerve by what gradual Methods of Proceeding, the Almighty Power was pleaſed to bring all his Works under every *Genus* to Perfection.

In the Mineral Kingdom, we have firſt *Semi-minerals*, then courſer Metals; as Iron, Lead, Copper, Silver; and Gold, which is the Perfection of that *Genus*.

Ver. 11, 12. *And God ſaid, Let the Earth bring forth Graſs, the Herb yielding Seed,* and *the Fruit-tree yielding Fruit after his kind, whoſe Seed* is *in it ſelf, upon the Earth; and it was ſo.*

The Mineral Kingdom being brought to its full Perfection, and the Seminal Principles of all the *Genera* of Vegetables being diſſeminated in the warm

Funds and Promptuaries of the Earth; and being, by the Incubation of the Spirit of God, formed, they were ready to obey that imperious word, *Let the Earth bring forth, and it brought forth* the ſeveral Species of Vegetables, not all at once, upon one day, but according to their different degrees of Perfection; as, firſt, Graſs, then Herbs, then Plants, then Shrubs, then Trees; among which, the *Oak* and the *Cedar* is the Perfection of that *Genus.*

The Vulgar *Expoſition* not agreeable with the Analogy of Nature.

Hence it is, that we have our monthly Productions, one ſucceeding another, and one Set dying, when the other commenceth.

Ver. 13. *And the Evening and the Morning* were *the third Day.*

Now it ſeems to me very diſagreeable to the Analogy of Nature, which never worketh in haſte, by precipitous Jumps, from one thing to another, but by a gradual Proceeding, that all the different degrees of Heat, in the Spring, Summer, Autumn, and Winter Seaſons, ſhould all take their Turns on one day, according to the Vulgar Expoſition, and produce their peculiar Vegetables in the ſhort time of twenty four Hours, which make a Natural Day.

The Earth being now covered with the ſeveral Species of Vegetables; Proviſion of Food and Nouriſhment was made by Divine Providence for a higher degree of Life.

God's Providence is viſible in providing Food and Nouriſhment for his Creatures before he created them.

But the Paſſive Matter being yet too cold and wateriſh to draw down out of the ſecond degree of Life, any of the Senſitive and *Loco-motive* Forms to Actuate and Inform it; the Almighty Power did therefore contract and collect this dilated Sphere of the *Æthereal Flame* of *Light* into one Body, which *Moſes* calls the *Sun*; that thoſe Vital Heats and Enlivening Incubations which ſtream from it, might be more ſtrong and vigorous, and penetrate into the Cold and Paſſive Matter.

Ver. 14. *And God ſaid, Let there be Lights in the Firmament of Heaven, to divide the Day from the Night, and let them be for Signs and for Seaſons, and for Days and for Years.*

Ver. 16. *God made two great Lights*, &c.

And God placed this Celeſtial Fire at ſuch a convenient diſtance from this Earth, that it might be neither too much ſcorched by being too near it, nor

Ver. 17, 18, 19. *And God ſet them in the Firmament of the Heaven, to give Light upon the Earth,* *And to rule over the Day and over the Night, and to divide the Light from the Darkneſs; and God ſaw that* it was *good. And the Evening and the Morning were the the fourth Day.*

nor frozen by being at too great a diſtance from it; but that it ſhould receive ſuch a temperate Heat from it, as to excite its Seminal Virtues, draw up its Juices, and thereby ripen its Natural Fruits.

He placed it alſo in the middle of the *Planetary Sphres*, that it might illuminate all thoſe dark and opake Bodies, and make them luminous Stars, and to be Lights in the *Firmament* of *Heaven*, to give Light upon the Earth, and to diſtinguiſh the Seaſons, and to divide the Time into Days, Months and Years.

The Diurnal Rotation of the Earth, the reaſonableneſs of it.

God gave to the *Earth* alſo a Diurnal Rotation upon its own *Axis*, that it might have the benefit of Day and Night every twenty four Hours; ſo that no part of the Earth might be too much heated by the Sun's preſence upon it, nor too long benighted by his abſence from it.

And as it is more agreeable with Reaſon, that the *Spit* ſhould turn about to the *Fire*, than that the *Fire* ſhould turn about the *Spit*; ſo certainly it's more agreeable with Nature's way of working, which never does any thing *per plura,* which might be done *per pauciora*; that the Cold and Paſſive Earth ſhould turn about its cold ſides to receive the warm Influence of the Sun, than that the Sun, which by ſeveral Diameters is bigger than this *Earth*, ſhould move round it once in every twenty four Hours.

The making of the Moon, and its Natural Uſes.

After the making of the Sun, God collected all thoſe wateriſh Fogs and Miſts which rang'd about in the Planetary Spheres into one Body, which *Moſes* calls the Moon; and he made it a vicarious Light to the Sun, to ſupply its abſence in this lower World.

Why *Moſes* calls it a great Light.

Moſes, by calling it a great Light, ſpeaks *ad Hominem*, it appearing ſo to our Senſes; for the Moon hath no eſſential Light in its ſelf, but what is mutuatitious, and received from the Sun.

The *Primum Calidum*, and the *Primum Frigidum.*

As God made the Sun a central Heat, and the *Primum Calidum*; ſo he made the Moon a central Cold, and the *Primum Frigidum*; that by its intermixing its Cold and Humid *Atmoſphere*, with the Hot and Dry *Atmoſphere* of the Sun, our *Atmoſpherial* Air might be fit for Reſpiration.

The Clearing of the Upper Firmament.

Thus, by collecting of the wateriſh Fogs to the Moon's Syſtem, the Upper Firmament, or the Planetary Spheres were cleared, and the Planets, with the reſt of the Stars, created in the Morning of the World, began to appear, and to ſend down their celeſtial and inviſible Influences upon this Earth.

The celeſtial ſecond Cauſe.

Thus God made the Sun and Moon, and the clearing of the Planetary Spheres, neceſſary ſecond Cauſes towards the Production of the Animal Life; and the Unition of Matter and Life made the fourth Production. He made the Stars alſo, but whether they commenced with the Formation of this Earth is not clearly expreſs'd.

Ver. 20. *And God ſaid, Let the Waters bring forth abundantly*

As the Seminal Forms of Vegetables were diſſeminated in the Earth, ſo were the Specifick

Forms of all the *Aquatick Animals* diſſeminated in the Waters; and undoubtedly, theſe took Life upon the *Spirit* of *God's* moving *upon the Waters*; and therefore *Moſes* makes them the firſt Product of the Animal Life.

ly the moving Creatures that have Life, and Fowl that *may fly above the Earth in the open Firmament of Heaven.*

And it cannot be reaſonably ſuppos'd, that all the ſubordinate Species of this Numerous Brood took all Life on the fifth Day, (as Dr. *W.* peremptorily affirms, and only to keep undamnify'd his eſpouſed and beloved Hypotheſis) but rather by a methodical and gradual way of proceeding, from the leſs perfect, which the Naturaliſts call *Litorales*, as the *Marine* Inſects, ſuch as Cockles, and the ſeveral kinds of ſhell-Fiſh, then the ſeveral kinds of the *Pelagii*; and laſt of all, *Moſes* tells us, that God created great Whales, which is the Perfection of this *Aquatick* Genus.

Ver. 21. *And God created great Whales*, &c.

Moſes, our great Philoſopher, makes Fiſh and Fowl *Congenial*.

The Affinity that is between Fiſh and Fowl.

1. And firſt, from the Parity of their Natures, being both *Oviparous* Animals.

2. From the Parity of their *Elements*, the Air and Water being the ſame Element differing only in degrees of Fluidity.

3. From the Affinity of their Operations, the Fiſh with Fins and Scales, ſwim in the Waters; and the Fowl with Wings and Feathers, ſwim in the Air.

4. From their manner of feeding, being both *Swollowers hole.*

Ver. 22. *And God bleſſed them, and ſaid, be fruitful,* &c.

By God's Bleſſing of them, is meant his Approbation of their ſeveral Species, and by impreſſing upon their Natures a ſtrong and an irreſiſtible Appetite to Propagate their kinds by Univocal Generation; and this we call the Law of Natural Inſtinct, or the Eſtabliſh'd Courſe of Nature.

Ver. 23. *And the Evening and the Morning made the fifth day.*

i. e. The Sympathetical Union of the *Aquatick* and the Aerial Forms with material Bodies, made the fifth Production.

Ver. 24. *And God ſaid, Let the Earth bring forth the living Creature after his kind,* &c.

The Waters and the Air being repleniſhed with their proper and peculiar Animals, agreeable with the Nature of their Elements, he proceeded to the

Creation of the ſeveral Species of *Terrene* Animals; and theſe, according to their different degrees of Life and Perfection; as,

The *Terrene* Animals are, 1. Inſects, 2. Imperfect Senſitives, and 3. Perfect Senſitives.

Firſt, Inſects, then imperfect Senſitives, then the more perfect Senſitives, as the ſeveral Species of Quadrupeds.

The Inſects are all *Oviparous*, and they are, 1. *Crawlers*, 2. *Creepers*, 3. *Leapers*, 4. *Flyers*.

The Imperfect are *Oviparous*.

The imperfect Senſitives are either *Spawners*, as the *Frog* and *Toad*; or *Oviparous*, as the ſeveral kinds of *Serpents*.

The Perfect are *Viviparous*.

The perfect Senſitives are all *Quadrupeds* and *Viviparous* Animals, of all which the *Lyon* and the *Elephant* are the Perfection of that Genus.

Ver. 26. *And God ſaid, Let us make Man in our own Image; after our likeneſs, and let him have Dominion over the Fiſh of the Sea, the Fowl of the Air, and over the Cattle, and over all the Earth,* &c.

God having now brought the Earth to its full Perfection; the *Interior Strata* and Conſiſtencies of it, being enriched with ſeveral kinds of *Minerals* and *metallick Ores*; the *Exterior Surface* being over-ſpread with a green *Mantle* of Graſs, beſet with Flowers, and beautified with all the kinds of Trees, from the meaneſt Shrub to the ſtately Cedar;

Having repleniſhed the Waters with innumerable Species of Fiſhes, from the ſmalleſt Marine *Inſect*, to the prodigious and frightful *Whale*;

The Gradations of Life.

Having furniſhed the Air with flying Fowls, from the ſmalleſt *Fly* to the lofty *Eagle*;

Having alſo ſtocked the Earth with all the degrees of *Terreſtrial* Animals, from the crawling *Worm* to the majeſtick *Lyon*, and ſtouteſt *Elephant*; he then went about to make a more noble Creature, that might be the Lord of the New World, and all its Furniture; and therefore (*More Humano*) calls a ſolemn Council, *Let us make Man*; as if *Omnipotency* had been *Impotent*, and Infinite *Wiſdom* had ſtood in need of Counſel: And the Reſult of the Council was, That he ſhould be made after their own Image and Likeneſs, *i. e.* that he ſhould have a Spiritual and Immortal Soul inſpired into a Material Body; ſo that he might have relation to the inferior Ranks and Orders of Creatures *ſubordinate to his Nature*; and over which he had given him a Title of *Dominion*; and that he ſhould have alſo a relation to the *Intellectual Beings*, being an Order of Creatures above his *Nature*; and by having a Communion both with the Viſible and Inviſible World, he might be *Copula utriuſque Mundi*, that Link that unites Heaven and Earth together: Thus Life is a Chain, by which we may aſcend from the meaneſt *Inſect*, Link by Link, 'till we aſcend to the *Supream Being*, the Fountain of Life and Perfection.

Life a Chain.

Ver. 27, 28, 29. *Male and Female created he them, &c.*

God having created them *Male* and *Female*, pronounced the ſame Bleſſing upon them as upon all other Animals; that they might propagate their Species by *Univocal Generation.*

Ver. 31. *And God ſaw every Creature that he had made, and behold it was very good.*

And God ordered Man for Food, the Fruits of the Earth; to the Beaſts he gave alſo to eat of the ſame, from the meaneſt *Inſect* to the largeſt *Quadruped*; and to the Fowl too, and to every Thing wherein there is the Breath of Life.

This is *More Humano*, he approved of his Creatures, being all agreeable to thoſe Shapes, Figures, and Ideas preconceived in his own Divine Underſtanding, and obſerving the Laws impreſſed upon their Natures.

Now the Author of the *Vulgar Expoſition*, cannot poſſibly underſtand this in a Literal Senſe, being that a full third part both of Beaſts and Fowl, are Carnivorous, and feed altogether upon Fleſh, unleſs he will take advantage of the Metaphor, *That all Fleſh is Graſs.*

I ſhall conclude with the words of the holy Pſalmiſt, *Pſal.* 8. 4, 8. who having conſidered the wonderful *Frame* and *Fabrick* of the *World*, the *Heavens*, the *Sun*, *Moon*, and *Stars*, breaks forth into a Tranſport of Admiration at the Divine Philanthropy, *What is Man that thou art mindful of him? And the Son of Man that thou viſiteſt him? Thou madeſt him lower than the Angels, to Crown him with Glory and Worſhip. Thou madeſt him to have Dominion over the Works of thy Hands, and thou haſt put all Things in ſubjection under his Feet; all Sheep and Oxen, yea, and the Beaſts of the Field, and the Fowls of the Air, and the Fiſhes of the Sea*, &c.

Moral

Moral Concluſions.

HAving in this ſhort and conciſe *Paraphraſe* given you the more *Philoſophical*, and Refined *Senſe* of this Comprehenſive *Syſtem*, I ſhall deduce from it (by way of *Recapitulation*) ſuch *Natural Inferences* and *Theological Concluſions*, as may convince any whoſe Intellectuals are not wholly Infatuated by the Charms of Senſuality, and are reſolved to deny the *Being of their God*, rather than the Gratification of their *Brutiſh Luſts*, that this Magnificent *Structure* of the *World* with its *Furniture*, was not the Reſult of *Caſual Motion* or *Blind Chance*; but the Effect of an *Omnipotent Power*, and Infinite *Wiſdom, Counſel* and *Contrivance*.

My Arguments of *Probation* ſhall be reduced to ſeveral *Claſſes*, according to the Method *Moſes* has proceeded upon in his Literal and Hiſtorical Deſcription of the *Creation.*

And firſt of all it's obſervable, that *Moſes* does not go about to prove the *Being* of a *God* expreſly by way of Argument; but implicitly, by deſcribing the *ſubordinate Degrees* and *Concatenations* of Life and Perfection; making Life a *Chain* by which we may gradually aſcend from the meaneſt *Inſect*, Link by Link, 'till we come to the *Supreme Being*, the Original and Fountain of Life and Perfection.

And any other way of *Probation* would, at that time when *Moſes* wrote the Hiſtory of the *Creation*, have been ſuperfluous and unneceſſary; for notwithſtanding that *Polytheiſm* and *Idolatry* had then overſpread the World, yet *Atheiſm* was not heard of 'till After-Ages.

David tells us that in his time, the *Fool had ſaid in his heart that there was no God*; but *David's Fool* was modeſt in Compariſon of thoſe of our Age, who aſſume to themſelves the Impudence of ſpeaking and diſputing *Fools*; but my Intention in this ſhort Treatiſe is not to ſpend Time and Labour in anſwering *Fools* in their *Folly*, but ſhall rather think it convenient to lay down ſuch Arguments, as are moſt proper to Convince and Confirm the more ſenſible Part of Mankind, that there is a *God*, that by his Omnipotent Power made the *World*, by his Infinite Wiſdom Contrived it, and by his Providence preſerves it in *Being*.

CLASS I.

My Firſt Claſs of Arguments ſhall be from the Conſideration,

1. Of the *Frame* and *Fabrick* of this *Terraqueous Globe* whereon we Live.

2. From the Circulation of the *Subterrene Waters*, and the Communion they have with the *Atmoſpherial* and *Nubiferous*.

3. From the Communion between the *Lunar Waters* and the *Marine*.

4. From the *Flux* and *Reflux* of the *Sea*.

5. From the Conſiſtence of the Saline Water, and the uſefulneſs of it in *Nature*.

6. From the more peculiar Advantages Man hath from the great convenience and pleaſure of Navigation.

7. From the proviſion God hath made to Encourage the Wit and Induſtry of Man in ſo concerning an Adventure.

I ſhall Treat of theſe in Order.

AND Firſt, if our Modern *Atheiſt*, who values himſelf ſo much upon his Witty Reaſoning againſt the Univerſal Belief of Mankind, would but imploy his Rational Faculties, in the ſtudy of Natural Philoſophy, he would meet with in that Syſtem ſufficient Arguments to convince him that there is a ſupream independent *Being*, by whoſe *Power* all things were made, and upon which all *Beings* have their dependance.

Let me then in the firſt place deſire him to Climb up with me to the Tops of thoſe Rudely ſcattered Mountains, that to ſome ſeem but to be ſo' many Wens, and unnatural *Protuberances* upon the face of the *Earth*; yet if he will but wiſely conſider how one part of the Earth is ſubſervient to another, and the Mountains to the whole, he will eaſily be convinced, that they are not only Ornamental but uſeful. And that the Infinitely Wiſe God hath ſo contrived all the Parts of it, that no part can be wanting without prejudice to the whole.

The Mountains being built up of the moſt ſolid *Strata* and *ſediments* of a *Hot Nature*, are not only made the Strong Columns and *Pillars* that ſupport the whole *Fabrick*; but in there Interior Conſiſtences are contained thoſe Warm and Moiſt Matrixs wherein thoſe Rich Veins of *Gold*, *Silver*, *Copper*, *Tin*, and other valuable *Minerals* are Ingendred, and receive their different degrees of Maturity and Perfection; which gives encouragement to Men to ſet their Wits on Work, to dig into thoſe dark Regions, to find out thoſe *hidden Treaſures*, which the God of Nature hath Immured in Cheſts of hard and ſolid Stone.

To which I ſhall only add that the frigidity of their lofty Tops, attracts the Atmoſpherial Vapours to them, the Nitrous part of which being Rarefyed into Wind, it drives before it the Rain and Showers, which Water and Moiſten the whole ſurface of the Plains and Vallies. I might enumerate more of the Natural uſes of Mountains, but I refer to the Chapter that treats more particular of them.

But Secondly, if the *Atheiſt* will venture himſelf into the *Interior Viſcera* or Bowels of the Earth, there he may obſerve thoſe wonderful *Water-Works*, that *Aquavitæ*, which circulates through the Veins of that *Great Body*; and to gratify his Curioſity, he may not only ſee a *Vein* cut and a perpetual *River* flowing from a dry *Hill*, but beſides the Water that circulates in the Veins the ſtrait Pores of the moſt denſe and ſolid Matter is ſaturated with it; which being Analagous to the Blood in Animals, and ſap in vegetables, keeps in Life and Perfection not only the more valuable Minerals, but all the other common *Strata* and conſiſtences of it.

And if the *Atheiſt* durſt Climb up and take a view of the Inward *Contextures* of thoſe High Mountains, he might with pleaſure, and to the great ſatisfaction of his Curioſity, obſerve the meeting together of thoſe large *Subterrene Veins*; and how thoſe perennial *Lymphæducts* play and bubble out from their upper *Strata, Sides* and *Skirts*, from whence all *Springs* and *Rivers* have their firſt Riſe and Original; and if he would pleaſe to follow the various windings and turnings of their long Courſes to the *Sea*, he may obſerve the Wonderful Providence of *God* in *Interlacing* the whole Surface of the Earth, with Rapid Streams of ſweet Water, for the convenience both of *Man* and *Beaſt*.

The *Atheiſt* having now followed the Courſes of the Rivers to the *Sea*, where they Empty themſelves into that Grand *Ciſtern*, I would Adviſe him to make a ſtand, and there obſerve the Strife between the *freſh River-Water*, and thoſe of a *Saline Nature*, which forceth back thoſe freſh *Intruders*, making a *Flux* in the *Rivers* ſometimes ſeveral Leagues upward; by which Repulſe the ſtrength of the *Salt-Water* being Spent; the Rivers return, and force their way into the *Sea*; which we call the *Reflux*: This cauſeing a *boiling Fermentation* in the *Sea*, the freſh *River-Water*, being thinner than the Salt, riſeth up in fogs and wateriſh Miſts, impleteing the *Atmoſphere* with moiſt Air; and the Clouds with Water which the good Providence of God (like a *careful Gardiner*) ſends down in Showers of Rain to Water the ſurface of the Earth for the Production of Vegetables.

Thus the Infinite Wiſe *God* of Nature hath ſettled a conſtant and regular *Communion* between the *Subterrene* and *Nubiferous Waters*; without which, this Earth would have neither been an Habitation for *Men* nor *Beaſts*.

Having now demonſtrated the Communion between the *Subterranean* and *Nubiferous Waters*; I might with the ſame facility ſhew that there is a *Communion* between the *Lunar* and the *Marine Waters* in our *Sea*, for the *Moon* being a Humid and Frigid Globe hath a mighty Influence not only on the Waters upon our Earth, but upon the *Plants*, *Trees*, *Fiſh*, and the *Moiſt Brains* of *Men*, which from the *Moon* are called *Lunaticks*.

Again the *Lunar Waters* being part of the ſame *Fluid Maſs* which covered our Earth, there continues ſtill a *Magnetick Sympathy* between them; hence it is that the *Moon* by its *Central Attractive Power* gradually ſwells up the Sea into a Gibboſity; till her Magnetick Attraction be over-powered by the *weight* of the *Water*; and then they ſink down again, which cauſeth that regular overflowing at every *Change* and *Full* of the *Moon*, and this we call the Spring-Tides; when this overflowing is over, then the Tides come to their certain *Courſe*, only varying an Hour in twenty four; which is occaſioned by the ſame Gradual Attraction of the *Moon*; thus the Waters below and above the Firmament would again reunite as they did at *Noah's Flood*, if God's Providence did not fix their bounds, which without the Divine permiſſion they cannot paſs.

The Finger of God is ſo viſible in cauſing this regular and conſtant Reciprocation of Tides ſo uſeful for *Navigation*, that the moſt profeſt *Atheiſt* (if he does not wilfully ſhut his Eyes) muſt be convinced that there is a *God* that orders all things for the good and benefit of *Man*; beſides this conſtant fermentation in the Sea cauſeth the *Saline* and *Nitrous* particles to ariſe, and being impregnated with the *Atmoſpherial Air*, make it more fit for *Reſpiration*; and it's this Aerial *Acid* that fertilizeth the Earth.

But to keep the *Atheiſt* no longer making obſervations upon the Sea-Shoar, I will incourage him to take Ship and venture to ride upon the Backs of thoſe frightful foaming *Waters*, when there are but four *Inches* between him and *Death*; for it's obſerved by an Ingenious perſon, that none fears *God* ſo much as he that denies that there is a God. *Hi ſunt qui trepidant & ad Omnia fulgura pallent.* But let him take courage to himſelf, I will ſhew him how to foreſee a Storm before it come, and tho' it be not in *humane power* to prevent it, yet he may prepare ſo as to eſcape the danger of Shipwrack.

And Firſt when he obſerves the Porpices and other Sea Fiſhes which delight to ſport and play upon the *Waters* of a troubled Sea, put up their heads and ſpout up *Water*, he muſt then expect that a Storm is approaching, for as we have already obſerved that the Original of *Winds* is from vaſt Swarms of *Nitrous* particles *Ariſing in the Bottom* of the Sea, which being put into fermentation by the *Subterrene* heat which abounds in that great Body, the firſt *Commotion* we call a Bottom Wind, which thoſe *Marine Fiſhes* quickly perceive, and by their playing upon the Waters give *Mariners* notice to prepare againſt a Storm. The Night following theſe Swarms of *Nitre* will be riſen up to the ſurface of the Sea, and then the Waters will appear as if they were all on *Fire*, and ſome of theſe *Nitrous* particles will fix upon the ſides of the Ship and upon the Maſts of it, which ſhining like *Meteors*, the Heathens formerly called by the Names of *Caſtor* and *Pollux*, and made Gods of them.

The Evening following the *Sun* will ſet *Red* and *Broad*, and the Sky be tinged with a *Crimſon Red*, and if the Vapours form themſelves into the figure of a *Ship* ſtanding Eaſt and Weſt, or North and South, or Croſſing any other Point, we obſerve that from that Point oppoſite to the *Sun*, the Wind will blow that Night, or next Morning; and the

Rain and Storm follow; which I hope will ſend my *Atheiſt* to his Prayers.

Having now prepared him to meet a Strom we will make a venture into the *Main Ocean*; and there obſerve the *Wonders of the Deep*; how the *Leviathan* the Lord of the Seas, takes his paſtime in thoſe Brackiſh Waters; after which, we will incourage our ſelves to *Croſs the Line*; and take a View of the other *Hemiſphere*; ſee the Southern *Pole*, and thoſe *Conſtellations* which the Interpoſition of the Earth keeps out of our ſight.

Again, Man being a knowing and Rational Creature there can be nothing more agreeable to his Nature than *Contemplation* and *Converſation*; if my *Atheiſt* have any thing of Man left in him, I ſhall endeavour to gratify him in both theſe properties; for by Riding upon the Backs of thoſe Liquid waves we ſhall at laſt, diſcover that this Earth is not flat and round like a Trencher, which was the Opinion of the *Ancients*, till *Columbus* croſs'd the Line, and found it demonſtratively true, that this Earth is of a *Globular Figure*, hanging pendulous in the Air, encompaſſed round with an *Atmoſphere*; we ſhall alſo convince the *Atheiſt* that the Sun does not riſe out of the *Eaſtern* Sea and goes to bed in the *Weſtern Ocean*; and being refreſh'd with a good draught of Salt Water, the next Morning riſeth out of its wateriſh Bed; and *like a Giant Refreſh'd with Wine delights to run his Courſe*; theſe were the *wild Opinions* of Men in the former days of *Ignorance*, before *Navigation* was improved to its full perfection, but are now experimentally known to be *Vulgar* and *Ridiculous Conceits*, grounded upon external Senſe, and not upon ſolid principles of *Judgment* and *Reaſon*.

For notwithſtanding that the *Sun*, by the Interpoſition of the Earth, goes out of ſight once in twenty four Hours, yet it always keeps its Motion within its *Orbit*, and never *Sets* nor *Riſeth* but, *quoad nos*, to the appearance of our outward Senſe.

Having now encompaſſed the *Earth*, and met with People we call *Antipodes*, having their Feet *Diametrically* oppoſite to our Feet, my *Atheiſt* being no Philoſopher (*Atheiſm* and *Philoſophy* being Inconſiſtent) it may give him occaſion to wonder that theſe People, with the Houſes they dwell in, do not drop down to the Sky, which to his Apprehenſion ſhould appear below them. To give him ſatisfaction in this Scruple, I muſt make him underſtand that this *Globe* of *Earth* is a *Center* of Attraction, and by its *Magnetick Virtue*, all heavy Bodies fix to it; beſides, we bear no more Proportion to this *Earth*, than a *Mite* does to a great *Cheeſe*, and it's equal to that little *Animal*, whether it be above or below the *Cheeſe*; as for *upward* and *downward*, they are only imaginary Terms, for what is under our Feet, we eſteem downward; and that which is above our Heads, upwards.

Another *Scruple* may be upon his Mind, concerning the Diurnal Rotation of this Earth, that a *Motion* ſo *Rapid* ſhould not throw down all our Houſes, which frequently happens by a great *Earthquake.* To this I anſwer, That the *Diurnal Motion* of the Earth is *Natural, Even,* and *Regular*; and all heavy Bodies built upon it, are in a State of *Natural Reſt*; whereas the *Shocks* of an *Earthquake* are by a *Motion* unnatural and violent; as if a Man going along the Highway, in his uſual and natural *Motion,* ſhould have his Heels *Tripp'd* up, which is a Motion unnatural and accidental.

By this time it may be convenient to go to Land upon ſome *Foreign* Coaſt, where we may meet with ſuch Diverſity of *Complexions*, *Manners*, and *Religions*, as cannot but be of infinite Uſe and Advantage to the Entertainment of his Thoughts with Pleaſure, and the Improvement of his Reaſon.

And notwithſtanding that in theſe *Foreign* Countries he may meet with *Turks*, *Jews*, and *Heathens*, as well as *Chriſtians*, I doubt my *Atheiſt* will not find for himſelf a *Companion* of his own Profeſſion; for the very *Heathen* do believe that there is a *Supream* *Being*

Being that governs the Univerſe, and have ſome kind or other of *Worſhip* and *Religion* among them: So that if it had been the Fortune of our *Atheiſt* to have been in the Ship with *Jonah*'s Mariners, when the Storm ſent them all to Prayers, if he had had no God to have pray'd to; they would certainly have thrown him over-board.

I ſhall only further add, That the Providence of God hath been pleaſed ſo to order it, that every Country ſhould have ſomething in *Perfection* that other Countries want, to encourage *Navigation* and *Trade*, one Nation with another; ſo that thoſe that ſtay at Home, enjoy by the *Travels* of thoſe that go Abroad, and thoſe that Travel get Riches by their Adventurers.

I ſhall conclude this Claſs of Arguments with this Conſideration, That *Navigation* being of ſo great conſequence to the Delight and Convenience of *Humane Nature*; and God having not only given Man, Wit and Courage to attempt the Sea, but hath provided him with Materials to build Ships, and of late Years the uſe of the *Magnet* being diſcovered, which guides him to ſteer his Courſe through thoſe vaſt Expanſions of *Water*; I ſhall appeal to any Man of an unbyaſs'd Reaſon, whether this excellent and wonderful Fabrick of the *Earth* and *Waters*, could be eſtabliſhed by any other Power than an *Omnipotent Being*, Infinite in *Wiſdom* and *Goodneſs*.

If we have now advanced ſo far in the Proof of a *Supream Being*, from the Conſideration of ſuch *Phænomena's* as ſeem more *rude* and *general*, what will the *Contemplation* of the more poliſhed and refined parts of Nature afford us?

CLASS II.

The ſecond Claſs of Arguments, for the Probation of a *Supream Being*, will ariſe from the Conſideration of the Nature of *Vegetables*. I ſhall proceed in this Method:

1. Firſt I will prove the *Being* of a *God*, from the different *Modifications* of *Matter*, for the Reception of the ſeveral and different *Seminal Forms*.

2. From the ſeveral *Ranks* and ſubordinate *Species* under this *Genus*.

3. From the *Form*, *Beauty*, and *Fragrancies* of *Herbs*, *Plants*, and *Flowers*.

4. From their Uſefulneſs to Man and Beaſts.

closer

THAT we may the better underſtand the Advantage we have in this *leſſer* *Contemplation* of the more *Polite* parts of Nature,

ture, we are in the firſt place to take Notice of the Nature and Quality of that Subſtance we call *Matter*; for if it be either too *fluid* or ſlippery, it's unfit for any Impreſſion, and therefore all Matter muſt *Rot* into a *ſlimy Moiſture*, before any thing can be generated of it; as we ſoften the *Wax*, before the *Seal* can make any Impreſſion upon it.

This *Modification* of the *Matter* is commonly from the Sun's Concoction, and Digeſtion of the Surface-Soil, and the *Aerial Acid* contributes much to the fermentation and Fertilizing of it; which being ſo *modified*, it becomes the *Matrix* wherein all *Vegetables* are ingendered, and thence grow up to Perfection; yet the Obſervation that the *Poet* made of Vegetable Productions muſt be taken Notice of here, *Omnis non fert omnia tellus*, i. e. every *Soil* is not productive of the ſame ſort of *Vegetables*; for as God hath made great variety of Species under this *Genus*, ſo he hath ordained different *Modifications* of Matter agreeable to their *Natures*, and moſt proper for their *Production*. Thus we obſerve, that *Tulips*, *Gilliflowers*, and *Primroſes*, will not naturally grow upon the tops of high Mountains, nor thoſe courſer Mountain-Vegetables, ſuch as *Furz*, *Fern*, and *Bent*, in Gardens of the beſt Cultivation and Tillage. Yet we are taught by daily Experience, that if the barren *Heath* of *Moun-*

tains be by Burning, Liming, and Tillage, changed into a more unctuous and pinguid *Modification*, thoſe courſer *Sets* of *Vegetables*, that were natural to that ſterile Soil, ſhall be quite deſtroy'd, and never more grow upon the ſame Soil, and a new *Set* of moſt rich *Graſs* and beautiful *Flowers*, ſuch as the *Clovers*, the *Cowſlip* and *Primroſe*, ſhall ſucceed therein. And without any Seed ſown upon that improved Ground, ſhall grow up and come to Perfection, ſo as to propagate their Species by Univocal Generation.

The Queſtion here will be, Whether this new *Set* of *Vegetables* had a ſpontaneous Generation, or ſprung up from *latent* and *dorment* Seeds, which could not exert their Seminal Powers, until the Matter was new *modified* by the infuſing into it a ſpirituous Ferment?

To the former I anſwer, That it is as morally incredible that *rude* and *undirected* Matter ſhould, by the infuſing of a new *Ferment*, either give the Form to the Stalk or Leaf, or imprint upon the Flower ſuch lively Colours, with ſuch curious Lineaments, as it is for ſoft Wax firſt to make the Seal, and then to engrave upon it ſome curious *Coat* of *Arms*, or the ſhape of ſome *Bird* or *Beaſt*.

For the ſolution and clearing of this dark *Phænomenon*, we muſt diſtinguiſh between *Seminal Principles*, and imbodied *Seed*, ſuch as *Wheat, Barley*, &c. the former being only the ſpecifick *Forms*, or ſpiritual *Entities*, of ſuch Creatures as *God* deſigned ſhould aſſume Bodies, when they meet with *Matter* modified for their Reception; and theſe Seminal *Principles* were diſſeminated through the whole Maſs of Matter, at the firſt Formation of this Earth; but cannot exert their Powers, 'till they meet with proper Matter. Hence it was, that the total Deſtruction of the former Species of Vegetables, and the Production of a new *Set*, was from the change of the Soil, and the new Modification of the Matter.

And this new Set of Vegetables being produced from thoſe latent and dorment *Principles*, it is of great Conſequence, that they have Seed in themſelves, for the Continuance and Propagation of their own Species; and alſo for gratifying Humane Art and Induſtry, much of which lies in Gardening and Husbandry.

It may ſeem very probable, that whilſt the *Earth* was in its *Antediluvian State*, and full Strength, it might from Seminal *Principles*, produce the ſeveral kinds of Plants and Vegetables; but now it's grown ſo ſluggiſh, that without the advantage of thoſe ſmall compendious Principles of imbodied Seed, and Cultivation, it will yield no ſuch *ſpontaneous Births.*

Having now from the different Modification of Matter evinced the Being of a God and Providence, I proceed to a ſecond Argument of Probation, which the Contemplation of the ſeveral Orders and ſubordinate Species under this comprehenſive *Genus* will afford us; to which we ſhall ſubjoin the Conſideration of that great Curioſity there is in the *Form* and *Beauty* of the more noble *Plants* and *Flowers*, with the Fragrancy of their different Smells and Virtues.

And firſt of all, it's very remarkable, that *Moſes*, the greateſt Natural Philoſopher that ever lived upon this Earth, repreſents *Nature* not working in haſte, by precipitous Jumps, from one thing to another, but by a gradual and regular way of Proceeding; as firſt, making proviſion of Meat before ſhe produceth the Animal, for any other Method would have been prepoſterous: He therefore makes common *Graſs*, *Herbs*, *Plants*, *Trees*, and the whole Set of *Vegetables* the firſt Production.

I ſhall firſt begin with the Contemplation of common *Graſs*, with which God hath over-ſpread the Surface of the Earth, as with a *Green Carpet*, in which Speculation, God's Providence is viſible, Green being a Colour moſt agreeable to our Eyes; whereas he might have inveſted it with a Mantle of *Black*, *Brown*, or *Red*, which would have been offenſive and hurtful to our Sight, and that either by too much *dilating* or *contracting* of it.

This *Green Carpet* he hath embroidered and enamelled with great variety of beautiful Flowers, emitting moſt grateful Fragrancies; and theſe bearing ſuch a Suitableneſs and Harmony with the more refined Senſe and Sagacity of the Soul of Man, cannot chuſe but affect him with an Intellectual *Touch*; and being ſo ſweetly gratified, he cannot (if he hath either common Senſe or Underſtanding left in him) but acknowledge ſome hidden Cauſe that is Intellectual, that is the Contriver and Perfecter of thoſe moſt curious and pleaſant Spectacles in the World.

Again, when we further conſider, that *Beauty* and *Symmetry*, and the *Comelineſs* of *Proportion*, with the delightful Mixture of *Colours*, and the fragrant *Smells* of Flowers, are the proper Objects of Humane Underſtanding and Reaſon, and ſuch eſſential Properties of Humane Nature, as diſtinguiſh it from brute Beaſts, who having no Underſtanding of theſe Things, take no Notice of them; for a filthy *Mare*, taken out of a Dunghill Cart, is as grateful to a luſtful Stallion, as one of the fineſt Shapes taken out of a King's Stable: And when Mens Luſts are grown ſo Hot and Impetuous, as to make no diſtinction between *Pulchritude* and *Deformity*, it's no wonder if theſe Men, having wholly brutified their Humane Nature, ſhould turn *Atheiſts*, and deny the *Being* of that God that made them Men. But to inſiſt no more upon this *Topick*, I ſhall proceed to a third Argument, from the Conſideration of the Uſefulneſs of all the ſorts and kinds of Vegetables, contained in this ſo large an Inventory.

And it cannot but afford Matter of Wonder and Admiration to a thoughtful Man, that any one that daily feeds on God's *Bread*, and drinks (perhaps) too plentifully of his over-flowing *Cups*, ſhould be ſo ſtupified by the Prevalency of his Luſts, as to deny the Being of that God, whoſe good Providence hath ſpread a Table every where for his Creatures, and hath not only furniſhed it with a juiceleſs *Green Carpet*, but with ſucculent *Herbage*, and nouriſhing Graſs.

Again, if the *Atheiſt* would but take the pains to be ſo thoughtful, as to conſider, that God hath ſet Man at the *Head* of the *Table*, and has given him not only the choiceſt of all the *Herbage*, but the beſt and moſt delicious of all the Fruit that grows upon the *Trees*, &c. for it cannot be imagined that *Apricocks* and *Oranges*, that *Apples* and *Grapes*, and ſuch like Fruit, were intended for Beaſts, that have their Heads downwards, and can ſcarce look up to ſee them, much leſs to know how to reach them,

them; and beſides, there are not many deſire them, he would find Reaſon to adore that Almighty Being that has ſo liberally provided for Mankind above the reſt of the Creation.

Again, it's eminently obſervable, that not only the *Vine*, but the moſt uſeful *Grains* of *Wheat* and *Barley*, &c. are made Edible and Potable by Man's *Art* and *Induſtry*; for without *Tillage* and *Husbandry*, they would either not be at all, or of little Uſe; thoſe that grow *wild* being good for nothing unleſs for Beaſts to feed upon; and therefore, to encourage Men's Wit and Induſtry, God hath made Inſtruments exactly fit for this Employment; as the *Oxe* and the *Horſe* for Strength; *Wood* and *Iron* for Utenſils and Inſtruments.

Having had the Pleaſure of viewing the Flowry *Meadows*, the plentiful *Corn Fields*, the fruitſul *Gardens* and *Orchards*; I will deſire the *Atheiſt* to take a turn with me in the *Foreſts*, where he may obſerve the ſtately *Cedar*, the robuſt *Oak*, and tall *Firr*; and likewiſe the *Elm*, the *Aſh* and *Birch*, and other Trees of a lower Order, yet proper for making of *Carts*, *Coaches*, *Ploughs* and Husbandry Geer; the former being more proper for Timber to Build *Houſes* and *Ships* with, without which we ſhould have been forced to have lived in little *Cabbins*, like *Bee-Hives*, or in *Rocks* or *Caves* underground.

Beſides, the loweſt Order of Trees, ſuch as *Shrubs*, *Thorns*, and *Briars*, they are uſeful for *Hedges* and *Fencing*; or at leaſt, for *Fuel.*

From what I have advanced upon this Argument, if the *Atheiſt* will but follow the free Suggeſtions of his own Reaſon, he muſt neceſſarily conclude, that there is a God, who hath made ſuch ample Proviſion for his Creatures, but eſpecially for Man. But I eaſily foreſee that the *Atheiſt* will object, that we have many ſtinking *Weeds*, and ſome of a poyſonous Nature; and are ſo far from being uſeful to Man, that they are deſtructive of *Health*, and ſometimes of *Life* it ſelf; but this Objection is the effect of our Ignorance, or want of Conſideration; for firſt, the Induſtry of Man is exerciſed by them, to weed them out, which Reaſon, if it ſeem ſlight, let him conſider, that if Humane Induſtry had nothing to ſtruggle with, the Fire of Man's Spirit, without Exerciſe, would be half *extinguiſhed* in the *Fleſh.*

But who knows but that it's ſo with poyſonous Weeds and Plants as it is vulgarly fanſied of *Toads* and *Serpents*, that they lick up the Venom of the Earth; ſo poyſonous *Plants* may reaſonably be ſuppoſed to draw to their Viſible Bodies that Malignant *Juice*, which if diffuſed through the other *Plants*, would make them leſs wholſome and fit for Nouriſhment.

Laſtly, It's very well known by thoſe who underſtand any thing of Natural *Philoſophy* or *Phyſick*, that thoſe Herbs which the Rude and Ignorant *Vulgar* call *Weeds*, are oftentimes made uſe of as the Materials of moſt Sovereign *Medicines*; for as the Frame of our Bodies cannot ſubſiſt and become *tenantable* without the Supports of wholſome Food; yet being it conſiſts of thoſe two oppoſite *Principles* of *Siccity* and *Humidity*, the Strife between them, and the Prevalency of one or the other expoſeth our Bodies to ſuch Diſeaſes and Diſtempers as have their Original Cauſe from too much *Heat* or too much *Cold*, God hath provided for us among theſe Vegetables ſuch Medicines as are proper for the Curing of thoſe Diſeaſes.

And that which ſeems here moſt remarkable is, that the Beaſts ſhare with us in their *Medicinal Virtues*; I ſhall only inſtance in the *Dog*, who, when he finds himſelf ſick at Stomach, by a Natural Inſtinct, knows his Cure, and preſently runs to *Graſs*; and having *eaten* it, it gives him a *Vomit*, and the *Dog* is well.

God having now ſpread his Table, and furniſhed it with all the Varieties that the Vegetable Kingdom can afford, our next Contemplation will be entertained with the Conſideration of ſuch Creatures as God has created and invited to ſo noble and plentiful an *Entertainment*.

CLASS III.

The Third Claſs of Arguments for the Proof of a God and Providence, will ariſe from the Conſideration of the Nature of Animals, in Contemplation whereof we will proceed in this Method.

1. Their *Procreation* and *Propagation.*
2. The *Make* and *Fabrick* of their Bodies, how agreeable they are with their proper Elements; And
3. Their Uſefulneſs to Mankind.

THE *Waters*, according to the *Moſaick Scheme*, being made firſt Productive of Animals, and Fowl congenial with the Fiſhes, our firſt Undertaking ſhall be to treat of the Nature of *Fiſhes* and *Birds.*

That which is moſt remarkable in the Natures of Animals, is the Difference we find in the manner of their *Procreation*, ſome being *Oviparous* and others *Viviparous*. And this Diſtinction is a viſible Sign of *Counſel* and *Providence*; for tho' it will be granted that the Species of *Fiſhes* and *Birds* might have continued and ſubſiſted if they had been *Viviparous*, yet it would have brought their *Individuals* to a very ſmall Number.

Fiſhes having the Priority of Creation, I ſhall firſt treat of their *Natures* in this Method.

God's Providence being ſo viſible in the Procreation and Propagation of *Fiſhes*, that I preſume it may be of ſome Advantage to us, to underſtand the Time when, and the Manner how they *Ingender*; and in this I do not depend only upon the Reports of *Fiſhers*, whoſe Buſineſs it is to frequent the Waters, and to obſerve the Times and Seaſons when *Fiſhes* are in a Right Condition to be taken, and moſt fit for Uſe; but I had the Curioſity to make it my own Obſervation, from which I give this Account of the Procreation of River *Fiſhes*, which is after this manner. When by their Summer Feeding they are grown fat and ſtrong, in *September* and *October* they Swim up the Rivers to the Spring *Heads*, where the Subterrene *Heat* and *Warmth* break out, and keep the Water from *freezing*; there, with their *Noſes* they dig Holes in the Sand, which they prepare as Birds do Neſts for laying their Eggs in; then, not by Penetration of Parts, like other Animals, but by playing Cheek by Jowle, and the *Sympathetical Touches* of their *Bellies*, the Female ſcattereth her Roans or Rows, and the Male ſpawns his Milt, which mingling together in the Hole or Neſt they had prepared for the Reception of their

Spawn, they cover it up, and then leave their Eggs to be Hatched by the under-ground Heat, which by the next Spring having got *Life* and *Strength*, they come down the River in moſt numerous Shoals.

And as the Freſh Water *Fiſhes* Ingender in the Spring *Heads*, ſo it ſeems moſt probable and agreeable to Reaſon, that the *Marine* and Salt Water *Fiſhes* do Ingender and ſcatter their Eggs in the Sub marine Quick-ſands, where the under-ground Heat and Warmth moſt abounds.

I ſhall not here enquire into the Nature and Manner how the nobler ſort of *Fiſhes*, ſuch as the *Whale*, *Dolphin*, *Sea-Calf*, and others of great Bulk, propagate their Species; whether by Spawning or by Emiſſion of the Genital Seed, in the manner of the *Viviparous Animal*, which is the Opinion of ſeveral Naturaliſts of good Authority; but that fluid *Element* which Providence has aſſigned for their Habitation, being not agreeable with the Natures of thoſe Animals that give Suck and nouriſh their young ones with Milk, I muſt diſſent from their Opinion.

Again, *Moſes* tells us that God commanded the Waters to bring forth exceedingly; for as Graſs and Herbs are not the Fruit of the Sea, and *Fiſhes* having neither Legs nor Wings to go to Land to ſeek their Food, it was neceſſary that they ſhould feed one upon another, the great ones upon the ſmall ones: And therefore, that they ſhould multiply in great Plenty, which they could not have done in ſo numerous a manner as 'tis apparent they do if they had been *Viviparous*. God's good Providence made them *Oviparous* that one might bring forth a hundred at a time: But this is to be underſtood only of the ſmaller *Fiſhes* which God hath made Food for the greater; and the *Whale* being the Lord of the *Seas* feeds upon all his Underlings.

As God's Providence is thus viſible in their Procreation and Propagation, ſo it's no leſs apparent in the *Make* of their *Bodies* agreeable to the Element they live in.

How handſomely do their *Gills* ſupply the Office of *Lungs*, that their Blood might be cooled with Water, as it is by the *Lungs* of other Animals with the *Air*; the *Bladder* of Wind found in their Bodies is contrived for their more eaſy Swimming; as alſo the manner of their *Fins*, which conſiſt of a Number of Griſtly Bones, long and ſlender, like Pins or Needles, and a kind of a Skin betwixt, which makes them thin and flat, like a Pair of Oars.

And as their Bodies are made agreeable to their Element, ſo they, as well as the Terrene and Aerial *Animals*, are uſeful to Mankind, ſome of their Bodies being moſt wholeſome and delicious Food, others affording great Plenty of moſt uſeful Oyl; and their very Bones are no leſs uſeful, eſpecially thoſe of the Whale.

From the Conſideration of Fiſhes I proceed to the Fourth Claſs of Arguments, namely to conſider the Nature of Fowls, and ſhall give the Reaſon why theſe, as well as Fiſhes, are *Oviparous*, and bring not forth alive.

CLASS IV.

THE Firſt Reaſon is, that there may be more Plenty of them, That neither thoſe *Birds* of Prey, nor *Serpents*, nor *Fowlers* might leſſen the Number of their Individuals, and deſtroy their Species; for if they had been *viviparous*, the Burthen of their Womb, if they had brought forth any conſiderable Number at a time, would have been ſo heavy that their Wings would have failed them, and every body might have catched the old ones. But this is not all the Advantage we ſhall make of this Conſideration; I demand what is it that makes the Bird prepare her Neſt with that Artifice to Lay her Eggs in, and then to Sit upon them 'till they be Hatched? How comes it that ſhe takes ſuch Care to feed her young with agreeable Food, and to diſtinguiſh between Food and their uſeleſs Excrements? Did ſhe learn all this from her *Mother?* Or rather does ſhe not ſhe knows not what? but yet 'tis what ought to be done by the moſt exquiſite Knowledge. Hence it is Concluſive, that ſomething elſe has Knowledge for her, which is the Maker and Contriver of all things, *viz.* the Omniſcient and Omnipotent God.

Having now ſhewn the Manner how *Birds* Generate and Propagate their Kind, we ſhall take into Conſideration the Make and Frame of their Bodies, which being, not only as to their *Shapes, Colours*, excellent *Symmetry* and Proportions, moſt beautiful and lovely; but ſo agreeable with the Natures of thoſe Elements wherein, and whereon they live, that the moſt profeſt *Atheiſt*, who has any thing either of Senſe or Reaſon left in him, cannot but diſcern the Power, Wiſdom and Providence of God in their *Make* and *Frame*.

Theſe *Amphibious Animals* have the Benefit of Two Elements, and ſome of them the Advantage of Three, viz. the *Earth, Water* and *Air*.

I begin firſt with the Water Fowl, ſuch as the *Swan*, the *Gooſe* and *Duck*; how obvious is it to any that will make Obſervations, how well they are fitted for the man- *Swimmers.*

ner of Life their *Wiſe Creator* deſigned them to Live? for they that Swim in the Waters, their Feet are framed for it like a Pair of Oars, their Claws being connected with a broad Membrane, and their Necks are long that they may paddle in the Mud and fetch out their proper Food.

Waders. Another ſort of Water-Fowl, ſuch as the *Hern*, and other ſuch like that live upon Fiſh, and are forced to frequent the Waters; How do we obſerve them walking by the Sides of ſhallow Rivulets upon *long Stilts*, like People that dwell in the *Marſhes*, and having long Necks like *Angle-Rods* (as *Ariſtotle* obſerves of them) whereby they are fitted to fetch out their Fiſh from the bottom of the Water. We further obſerve of them, that their Claws have no ſuch Membranes as the *Swan*, *Gooſe* and *Duck*; for thoſe would have been a Hindrance to thoſe Fowls that only *wade* in the Water and do not *Swim*.

Divers. A third ſort of Water-Fowl are the *Divers*, ſuch as the *Sea-Maw*, &c. How do they hover over the Water, fluttering with their Wings, by which, as 'tis obſerved, they tempt the Fiſh to come up to the Surface of the Water to gaze at them, and then with a Motion, almoſt as quick as Sight, they fall upon their Prey.

From the Water-Fowl that feed upon Fiſh and Frogs, we proceed to the *Carnivorous*

Birds that feed upon Fleſh; theſe being Birds of Prey are alſo fitted for their way of living, having ſhort Necks fit for Strength, crooked Talons fit to hold faſt the Live Prey that it wriggle not from them; their *crooked Beaks*, like ſharp Hooks, are fit to tear the tough Fleſh; but we obſerve that the Bills of *Swans*, *Geeſe* and *Ducks* are broad, yet fit for rooting, for puddling in the Mud, and ſhearing of Herbs and Graſs, or ſuch eaſy Feeding. *Birds of Prey.*

From theſe Martial and Marſhy Birds we proceed to the Wood and Field Birds, which feed much upon the Fruits of Trees, *Corn*, *Seed* and the like; the Bills of theſe are all ſharp-pointed, fit for picking up *Corn*, and the like proper Food; their Talons are open fit for ſcraping in the Mould, *&c.* *Wood and FieldBirds*

Thus the God of Nature hath made nothing in vain, but for Good only, being all ordered by Counſel, Wiſdom and Providence.

To which we ſhall ſubjoin, that Providence hath made them all in ſome meaſure uſeful to Man.

Some to furniſh our *Tables* with moſt wholeſome delicious *Food*; others to delight our *Eyes* with the excellent Symmetry of their Shapes and beautiful Colours; others to Serenade our *Ears* with the variety of their Muſical Notes; and thoſe Birds of Prey that are ſo *Carnivorous*, to leſſen the number of the ſmaller Birds, that they may not over-ſtock their Feeding. Beſides, if ſuch *Animals* as die of Age ſhould leave their *Carcaſſes* to rot upon the Ground, the Stink would corrupt the Air and be offenſive to *Man.*

Having now entertained our Speculation with the Conſideration of the Natures of *Fiſhes* and *Fowl*, I ſhall proceed to a Fifth Claſs of Arguments for the Proof of a *God* and *Providence*, which will ariſe from the Contemplation of the Natures of the *Terrene Animals*; and we ſhall proceed much in the ſame Method we have uſed in the former *Claſſes*; we will Conſider,

CLASS V.

1. *Procreation* and *Propagation.*
2. The *Make* and *Fabrick* of their Bodies.
3. Their *Uſefulneſs* to *Man.*

AND Firſt it's obſervable, that as Providence hath furniſhed the *Vegetable* and *Fluid Kingdoms* with great Variety of different Species of Animals, not only ſubordinate, but ſubſervient one to another; ſo the ſame Providence hath ſtocked this Earth with great Variety of *Animals* of different *Species*,

Species, all ſubordinate and ſubſervient to *Man*, being the Perfection of the Viſible Creation, and God's Vice-gerent upon this Earth.

I ſhall begin our *Contemplation* with the loweſt Order in this ſo ample and large an Inventory, which *Naturaliſts* call by the Name of *Inſects*; theſe have their Life in the *Skin*, having neither Fleſh, Blood nor Bones, like other Animals of the Superior *Orders*.

Of Worms. Of all which the *Crawling Worm* is look'd upon to be the moſt contemptible and uſeleſs of all God's Creatures; but this only is a haſty Thought without Conſideration, which will appear if we obſerve the *Time* of their *Ingendering*, and the Matter on which they are *Ingendered.* The Time is in the Spring Months, when the Earth abounds with a groſs, pinguid and luxuriant Slime, of which theſe Vermine are Ingendred, and then feed upon it; which, if it were not ſuck'd up, and contracted to the Bodies of theſe Diminutive *Animals*, but diffuſed through the Graſs and Herbage, would occaſion Murrains and other Diſeaſes in Beaſts; and alſo in Men, who at that Time and Seaſon feed much upon *Sallads* and Herbage.

Again, theſe *Worms* are, by God's Providence, ordained for the Food of the *Vernal Birds*, ſuch as the *Cuckow*, and others that feed altogether upon *Worms:* Beſides, at this Seaſon the *Birds* do Hatch their young ones, and Nature hath provided theſe *Worms*, being of ſeveral Sizes, for their firſt Food and Nouriſhment; as the *ſmaller Birds* gather up the ſmaller *Worms*, ſo the *larger Birds*, ſuch as the *Crow*, the *Raven*, and the like, thoſe of a greater Size; and when they have filled their Crop they diſgorge them to their *young Brood*, which with open Mouths greedily receive them; and this is as proper Feeding for them as Milk is for Sucklings.

Flies. The next Order of *Inſects*, which is not only thought uſeleſs but hurtful to *Man*, is thoſe vaſt Swarms of *Flies*, which in hot ſultry Weather fill the Air; this alſo is the Effect of Ignorance and want of Thought; for as theſe are Ingendred of Corruption in the Air, ſo they feed upon it and contract it in their little Bodies; which if it were diffus'd through the Air, we ſhould breath Corruption, and either *Inſects* would take *Life* in our Bodies, or elſe Infect us with moſt dangerous Diſeaſes, as *Plagues*, *Fevers*, &c.

Polypodes. A third Order of *Inſects* that ſeem leſs uſeful, if not hurtful to *Man*, are the *Polypodes*, ſuch as the *hairy Worms* and the *Aſp*.

As the groſs *Crawling Worm* is generated of *Humidity*, which is a Vehicle of Sweetneſs and an *Antidote* againſt *Poyſon*; ſo theſe *Polypodes* are generated of *Siccity*, and having it predominant in their *Conſtitutum*, they feed upon ſuch dry Exhalations as are of a Poyſonous Nature; which, if diffuſed either through the Air or Herbage, would be more hurtful to us than their little Bodies: And beſides God hath ingrafted in our Nature an Antipathy to their Forms, ſo that we know them, and can eaſily avoid the Danger of them. But to make Reparation for all thoſe *little Animals* that are ſeemingly hurtful; *God* hath created the *Hive-Bee*, which by her Labour and Induſtry gathers for us moſt delicious Food; that Cœleſtial *Manna* which falling upon *Flowers*, *Leaves* of *Trees* and *Plants*, ſhe ſucks it up and brings it home to her *Hive* in a little Bag within her Belly; and having lodged it in her little Cell, ſhe Seals it up with Wax, either for her own or Humane Uſe.

The Hive-Bee.

But I haſten to a higher Order among the Terrene Animals, which differing from *Quadrupedes* are accounted Imperfect *Senſitives*, ſuch as the *Snake*, the *Adder* and *Serpent*; tho' theſe have a natural Enmity for our Nature, and upon the leaſt Provocation threaten our Deaths by their Poyſonous *Bite*, yet it is believed that they lick up the *Venom* of the Earth; which, if it were diffuſed, might be of more dangerous Conſequence than their *Bite* or *Sting*. Beſides, though they hide themſelves in the Graſs, yet upon our Approach towards them, they give us Notice by their *Hiſſing*, and the *Rattle-Snake* by her *Rattles*, that we may avoid the danger of their *Bite* or *Sting.*

Having now conſidered the Natures of ſuch *Animals* as are of the loweſt Orders, and are by *Naturaliſts* accounted Imperfect Senſitives, being all either *Oviparous*, or *Spawners*, ſuch as the *Frog* and *Toad*; for notwithſtanding that ſome of the *Marine Fiſhes* of large Bodies may generate after the manner of *Viviparous* Creatures by Penetration of Parts; yet I am of Opinion, that the *Female* ejects her *Spawn* in the Waters, which takes Life, and comes to Perfection after the manner of *Frogs.*

I proceed now to the higheſt Order of *Animals* which are *Viviparous*, and bring forth their young alive; theſe being all *Quadrupedes*, are eſteemed the moſt perfect among the Senſitives; yet among theſe there are ſome that appear rather hurtful than uſeful to *Humane Nature*, ſuch as *Rats*, *Mice*, and the like; yet we muſt allow theſe to be of God's Creating, and in Nature's Storehouſe Meat is provided for them; and if they prove hurtful to *Man*, he muſt not blame *God*, but rather ſuſpect his own Ignorance; yet that the Number of theſe might not increaſe ſo as to be offenſive to *Man*, *God* hath ordained the *Cat*, the *Weeſel* and the *Owl* to deſtroy them.

And becauſe theſe hunt for their Prey in the Night, Providence has given them ſuch ſparkling and flaming Eyes, as emit ſuch Rays of Light, that without either the Light of the Sun, or a Candle, they can ſee to catch their *Prey*; beſides, thoſe Animals come out of their private Apartments to gaze at the glare of their ſparkling Eyes, by which they are charm'd into an Inſenſibility of Danger, and ſo become a Prey to the Hunter. And after this manner we obſerve Fiſhes to be catched with flaming Straw.

But that the Numbers of Inſects, and ſuch Vermine, may not be offenſive to us, Providence has ordained ſome of the ſuperior Orders of Creatures to make it their Buſineſs to deſtroy them, eſpecially when their Increaſe is too Numerous.

It is reported, that in the *Weſt-Indies* there is a Beaſt, which *Cardan* calls *Urſus Formicarius*, whoſe very Buſineſs it is to eat up the *Ants*, which ſome parts of that Quarter are ſometimes exceſſively plagued with: We might inſtance alſo in ſome Creatures, that do not only bear a ſingular Affection for Mankind, but are alſo fierce Enemies to thoſe Creatures that are cruel and hurtful to Man; ſuch are the *Lizard* to the *Serpent*, the *Dolphin* to the *Crocodile*, the *Elephant* to the *Dragon*.

Having now taken a View of ſuch Creatures as are ſeemingly hurtful, and of leſs uſe to Mankind, I proceed to conſider the more noble Orders of *Brutes*, whoſe Uſefulneſs is ſo obvious and viſible, that to enlarge upon this Topick would ſeem unneceſſary; I ſhall therefore be very ſhort in this Contemplation, and only give Account, firſt,

1. Of their Uſefulneſs for *Humane Food* and *Suſtenance*.

2. For aſſiſting us in our *Labour* and *Induſtry*, in Tilling the Ground, and Husbandry; in bearing *Carriages* for us, and for our *Riding* long Journeys upon, and other like Uſes.

3. And likewiſe for our *Pleaſure* and *Diverſion*.

Thoſe for *Food* and *Suſtenance*, according to the *Moſaick* diſtinction of *Animals*, into Clean and Unclean, are ſuch as chew the *Cud*, and divide the *Hoof*, and are Feeders upon Graſs, Corn, and Herbage.

And notwithſtanding, that the *Horſe*, the *Aſs*, the *Camel*, and *Elephant*, are not *Carnivorous Animals*, and eat Fleſh, yet being that they neither chew the *Cud*, nor divide the *Hoof*, they are not (in Chriſtian Countries) made uſe of, as either proper or wholſome Food for Man; but are made uſe of for Labour, to aſſiſt our Induſtry in Tilling the Ground, and other neceſſary Conveniences of Humane Life.

Among thoſe many Creatures for Labour and Service, I muſt not omit the common *Cur*, how uſeful he is for the *Shepherd*, and the ſtout *Maſtiff* to guard the *Houſe*.

And as *God* hath not only provided for our Food and Nouriſhment, but for Labour and Service, ſo the good Providence of God hath provided for Man's *Pleaſure* and *Diverſion*; for as it hath pleaſed *Providence* to conſider our Frame, that there being not a thoughtful Creature upon this Earth but Man, and that all or moſt of the Troubles our Nature is expoſed to, are occaſioned by our too much Thoughtfulneſs, he has therefore not only given us *Bread* to ſupport our Bodies, but *Wine*, and other *ſpirituous Liquors*, to baniſh Thoughtfulneſs, and to make us to have chearful Countenances.

He hath alſo created a great Number of good *Creatures* for no other uſe but our *Pleaſure* and *Diverſion*; as the *Spaniel*, the *Grey-hound*, and *Hound*, not forgeting ~~the~~ the *Maſtiff*; all theſe know their proper *Game*, and *Nature* has given them ſo quick and acute a Senſe of *Smelling*, that they cannot only diſtinguiſh their proper *Game*, but purſue it by the *Scent* they leave behind upon the Ground.

Having now, with my *Atheiſt*, taken a Ramble through the whole Syſtem of Viſible Nature, that he may not ſtumble ſo near his Journeys end, I will endeavour, before I conclude this Argument, to remove ſuch Difficulties as may lie in his way: And firſt, it may occaſion Matter of Wonder to him, that Man, being ſo much God's Favourite, ſhould come *Naked* into the World, when all other Creatures come from the Womb with their Natural *Cloathing*; and again, why Man ſhould be the moſt Impotent of all the Creatures, having neither Strength to ſtand upon his Feet, or ſo much of Natural Inſtinct, as to find his Mother's Breaſt that gives him ſuck.

To the firſt I anſwer, That notwithſtanding God hath given to Man a Title of Dominion over all the Creatures, yet Man cannot reaſonably expect that *Coats* and *Breeches*, *Silk-hoods* and *Furbelow-ſcarves*, ſhould either grow out of the Ground, or drop from the Skies, it's ſufficient that *Providence* affords him proper Materials, as the *Skins* of *Beaſts*, the *Wool* of *Sheep*, *Hemp* and *Flax*, &c. nay more, God has brought the *Silk Worm* into the World for no other Buſineſs, than to furniſh Man with more coſtly Cloathing, and to ſpin away her very Entrails to make him fine and gay; and as God hath given Man, Wit and Art, it's a Reproach to his Nature, if he does not make uſe of it, for his own Advantage.

Again, it's confeſs'd, that Man, when he comes from the Womb, is the Weakeſt and moſt Impotent of all Creatures; yet God hath made his Parents rational Creatures, and by the Laws of Nature, they are oblig'd to ſupport their Childrens weakneſs with proper and agreeable Food; and this Care and Parental Love and Affection, is gratefully to be acknowledged and repay'd by *Children* to their *Parents*, when, by Age, they are grown Old and Impotent.

Again, it may ſeem a Hardſhip upon the inferior *Orders* of *Creatures*, that they ſhould be always at our Mercy to kill and butcher them, when we have occaſion, either to fill our Bellies, or cloath our Backs; but this, when more cloſely enquired into, will prove a Kindneſs, rather than Cruelty, to thoſe Creatures; for what, if occaſionally and orderly, we kill ſome of them for Food, their Diſpatch is quick, and much leſs dolorous, than that they ſhould be torn in pieces by ſuch cruel Maſters, as the *Lyon*, the *Bear*, or *Tiger*; who would not give them time to die, but even eat their Fleſh from their Bones alive; and if they ſhould live to the tedious Melancholy, and Sadneſs of Old Age, it would firſt torture them, and then kill them, and leave their Carcaſſes upon the Ground, rotting, ſtinking, and uſeleſs.

Another ſtumbling Block in the *Atheiſt*'s way, is the Conſideration of *God*'s creating ſuch cruel *Birds* and *Beaſts* of *Prey*, which live upon the Fleſh, not only of the inferior Ranks of *Animals*, but even threaten and endeavour the Deſtruction of *Man*, and the whole *Humane Race.*

To which I anſwer, That God has not only given to *Man*, Wit and Courage, but hath furniſhed him with *Horſe* and *Arms*, and hath created the ſtout and generous *Maſtiff* to be his Second, and to venture his Life for his *Maſter:* So that he is able to bid Battle to the very fierceſt of them, and either chaſe them away into *Solitudes* and *Deſarts*, or elſe bring them under his ſubjection, and give Laws to them. Beſides, theſe *Martial Beaſts* are not only for Ornaments of the Univerſe, but to exerciſe Man's Wit and Valour, when he pleaſeth to encounter with them.

Again, to expect, or wiſh, that there ſhould be nothing in the World, but ſuch *Dull* and *Tame Animals* as can neither *Bite* nor *Scratch*, is as groundleſs and childiſh, as if there ſhould neither be Choler in the Body, nor Fire in the Univerſe.

Before I proceed to another Claſs of Arguments, I deſire that the *Atheiſt* would tell me (if he can) why there are not as many Foxes as Sheep, and as many Wolves, Bears, and Tigers, as there be of the uſeful Beaſts? Do not theſe all propagate their Species, and bring forth more at a time, than either the *Sheep*, the *Mare*, or the *Cow?* It's not in the Power of Philoſophy to give a Reaſon for this, for there can be no other Cauſe for this Wonder in Nature, but the Divine Providence, which ſo ſtreightens their Increaſe, that they may not be too offenſive and deſtructive, either of Man or Beaſt.

CLASS VI.

The ſixth *Claſs* of *Arguments*, for the Proof of a *Supream Being*, and a *Divine Providence*, will ariſe,

1. Firſt from the Conſideration of the *Frame* and *Structure* of *Humane Bodies*.

2. From the Internal Faculties of his *Soul*, and the neceſſary Cauſe of Diſorder in *Man's Nature*.

3. From the Agreeableneſs of the Divine Wiſdom, that there ſhould be ſuch a Creature upon this Earth as Man.

I Needed not have taken the *Atheiſt* thro' the Works of Nature, to ſeek out Arguments to prove the *Being* of a *God*, for he may be plentifully furniſhed at *Home*, if he will but take the pains to look into himſelf.

Let him firſt look into the Frame and Structure of his own Body, and wherein he differs from the *Make* of all the inferior Orders of *Brutes*, and he will find ſuch ample Teſtimonies, that he cannot be ſo ſottiſh as to deny the *Being* of that *God* that made him a *Man*, and not a *Beaſt*.

Let him tell me, why the Beaſts have their Heads downward, and the Frame of his Body is Erect; but that the Beaſts being only ſenſual, can be capable of no other Happineſs but what is agreeable to their Senſes.

And tell me why hath *God* made the *Body* of a *Man* erect, with his Face toward *Heaven*, but to fit him for *Contemplation*, which none of the brutiſh Tribes are capable of: He can look down with pleaſure, upon the ſeveral Orders of *Beaſts*, being Creatures below his *Nature*; and he can look upward with more delight and pleaſure, and form *Ideas* of thoſe Spiritual and Intellectual *Beings*, which are an Order of *Creatures* ſuperior to his *Nature*; he can contemplate *Heaven*, from whence his *Humane Soul* had its *Original*, and have a Notion of thoſe *Glorious Manſions* prepared for its Entertainment, when it leaves his *Body*, if (by his *Atheiſm* and *Infidelity*) he makes not a Forfeiture of ſo great a *Happineſs*.

Tell me, why has *God* made his *Mouth*, *Tongue* and *Lips* ſo fit for Articulate Speech, but that he ſhould have, not only a Communion with his own Species, but be a Prieſt in this *Magnificent Palace* of the *Univerſe*, and ſend up Prayers and Praiſes to the great *Creator* of all things, in the Behalf of himſelf, and the reſt of the Creatures under his Dominion?

Again, tho' the Brutiſh Creatures have *Eyes*, *Ears*, and other Members in common with *Man*; yet in *Man* there is more of *Divine Majeſty* in his Countenance; a more exquiſite Symmetry of Parts than is to be found in the Frame and Fabrick of *Brutes*; inſomuch that if it had been in our Power to have made our ſelves, we could have framed our ſelves no otherwiſe.

How are our *Eyes*, thoſe two *Inlets* by which our *Souls* take in Idea's of things without, conveniently placed in our Heads? How are they fortified with two Wreaths of Hair which are not more ornamental to our Faces than uſeful to keep the Sweat of our Foreheads from endangering our Sight?

How are the *Eye-lids* fortified with little *briſtly Hair* againſt the Aſſaults of *Flies* and *Gnats*? beſides the *upper Lid* claps down every Night to ſecure the *Eye* whether there be any Aſſault or not.

Again, Tell me why are the *Fore-Teeth* ſharp like *Chizels*, and the *Inner-Teeth* broad? but that the former are to Cut, and the other to Grind.

Why have we three Joints in our *Fingers* and but two in our *Toes?* but that the Hands may be ſtronger to hold faſt what they have in Poſſeſſion, and more uſeful to us in Manual and Mechanick Arts.

From what I have inſtanced, it's demonſtratively evident, that nothing is made fooliſhly or in vain, but by the Providence of a Wiſe God that ordereth all things, not only upon this *Earth* but in the whole *Univerſe.*

Theſe *Contemplations* are ſo grateful to a *Man*'s Reaſon, and the inward Faculties of his *Soul*, that they entertain a Man with more ſolid and laſting Pleaſure, than all the Suavities of Senſual Delights, which are but the Momentary Satisfaction of a Brutiſh Luſt; and when theſe Carnal Pleaſures are forbidden by God and our own Conſciences, like *Bees* they leave more Sting than Honey behind them; and oftentimes there is but a Minute of Time between the Enjoyment of the Pleaſure and Repentance.

But if the *Atheiſt* cannot be convinced that there is a *God* and *Providence* by the outward Frame of his Body, I muſt deſire him to look *inward*, and he there will find a

Principle, not only ſuperior to *Senſe*, but *ſeparate* and *independent* upon it; and this appears from the different Objects of either Faculty; for Example, *Reaſon* is ſenſible of *God*, of *Religion*, of *Spirits*, of *Shame*, of *Compaſſion*; but *Brutes* have no Senſe at all of theſe things, nor can form the leaſt *Perception* of them. Now tell me to what End ſhould *Nature* have planted in *Man* ſuch ſtrong Propenſions to *Religion*, which conſiſts chiefly in the Belief of a *God*, the *Immortality* of the *Soul*, and a *future State*, if there be neither *God*, *Angel*, nor *Spirit*, nor a *future State* after this *Life*? This certainly would have been ſuch a Slur committed by *Nature*, as no Wiſe *Being* can excuſe.

Again, We obſerve that *Reaſon* bridles *Senſe*, curbs it, and ſometimes acts quite contrary to its Intereſt. Hence it is that ſome of thoſe *Refined Wits* even among the *Heathen Philoſophers*, as well as *Chriſtians*, have, by mortifying their *Luſts*, ſubduing their *Animal Paſſions*, and ſequeſtring themſelves from the *World*, ſo exalted and ſublimed their *Souls*, that they have lived even as if they were out of the *Body* whilſt in the *Body*.

Beſides, Experience daily ſhews us the *Contrariety* between the two *oppoſite Judgments* of *Reaſon* and *Senſe*; For firſt, *Senſe*, for Example, judgeth the Sun's *Diameter* to be but a *Span*; *Reaſon* here oppoſeth, and judgeth it to be much bigger than the *Diameter* of the *Earth.* Infinite other Examples might be given, but this one may ſerve for all.

The Diſagreement of the two *Appetites*, and how they draw ſeveral ways and torture the *Heart* of *Man,* is evident by every *Man*'s Experience, as well *Heathens* as *Chriſtians.* *Ovid* brings in *Medea* complaining tragically in theſe Words, *Metamorph.* L. 17.

——— Aliudq; Cupido
Mens aliud ſuadet ;————
————Video meliora proboque
Deteriora ſequor.——— —

A new felt Force my ſtriving Powers invades,
Affection this, Diſcretion that perſwades.
I ſee the Better, and Approve it too ;
The Worſe I follow——

The *Scripture* is plentiful in this Argument ; *The Spirit,* ſaith our *Bleſſed Saviour, is willing but the Fleſh is weak. The Spirit coveteth againſt the Fleſh, and the Fleſh againſt the Spirit. I find a Law in my Members warring againſt the Law of my Spirit, leading me captive into ſin ; I do not that which I will.* Nothing can ſolve this Knot but the acknowledging a *Deity*, and that Man borders between the two Regions of *Matter* and *Spirit*; and therefore it is no wonder, that there is ſuch tugging and pulling this way and that way, upwards and downwards; for thoſe that dwell in the Confines of two *Kingdoms*, are moſt ſubject to *Diſquiet* and *Confuſion.*

Having now given the Reaſon why there is ſo much Diſorder of the *Paſſions* in the *Soul* of Man, ſome tying him down to the *Body*, others lifting him up towards *God*; it remains, that in the laſt place, I ſhew how agreeable it is to the Wiſdom of *God* and *Nature*, that there ſhould be ſuch a Creature upon this Earth as *Man*; for there being ſo many notable Objects in the World to entertain ſuch Faculties as *Reaſon* and *Contemplation*, there ought certainly to be ſuch a *Member* of this *Viſible Creation* as *Man*, that thoſe Things might not be in vain.

For tell me, if there was not *Man* upon this Earth, which, among the *brute Animals*, would have had the Knowledge to dig into the Bowels of this Earth, to find out thoſe hidden Treaſures of *Gold*, *Silver*, *Copper*, and other valuable *Minerals*, which are immured in the *Cheſts* of hard Stone? Which, among the *Brutes*, would have looked up to *Heaven*, and obſerved the Motion of the *Planets*, and diſtinguiſhed between the *fixed* and *erratick Stars*? Who would have found out the Art of *Navigation*, and diſcovered

Foreign Countries? Who, among the *Brutes*, would have praiſed the great Creator, for thoſe vaſt Numbers of good Creatures, with which he hath ſtocked and furniſhed the Earth? Thus we ſee all filled up, and fitted without any Defect or uſeleſs Superfluity; it is then as natural to conclude, that all this is the Work of a wiſe *God*, as at the ſight of a Noble and well contrived *Palace*, we conclude it to be the Work of a wiſe and ingenious *Architect*.

CLASS VII.

My Seventh *Claſs* of *Arguments*, for proving the *Being* of a *God* and *Providence*, will ariſe from the Contemplation of the eſtabliſhed *Courſe* of *Nature*, and the wonderful Power of *Natural Inſtinct* in *Inſects*, *Birds*, and *Animals* of the loweſt Orders.

AS the *Almighty Creator* of the *Univerſe* made the whole *Syſtem* of this *Viſible World* we live in, in Weight and Meaſure; and that not only the outward *Fabrick*, but alſo the inward *Furniture* might be kept in the ſame Beauty and Order he at firſt made it, he impreſſed *Eternal Laws*, as well upon the *Inanimate Bodies*, as the *Animate Creatures*, which Laws we call the *Courſe of Viſible Nature*; as firſt, he made not only this *Earth*, but all the *Etherial Globes*, both fix'd and floating, *i. e.* all fix'd upon their *Centers*, and all floating about their *Orbits*; and this Circular Rotation about their *Orbits*, we call the *Eternal Law* of *Natural Motion*, which theſe *heavenly Bodies* keep Conſtant, Regular, and Uniform, without ever varying higher or lower, ſwifter or ſlower; *The Sun*, ſaith the Pſalmiſt, *knows his riſing, and the Moon its going down.*

Upon the ſeveral Orders and Ranks of Creatures, he likewiſe imprinted Laws according to their *Natures*; upon *Vegetables*, the Law of *Vegetation*; upon *Inſects*, which is the loweſt Order of the *Animate Creatures*; he imprinted *Inſtinct*, as a Law upon their Natures; by the Tenor of which Law, they are obliged to *Propagation* and *Self-Preſervation*; in order to which, he made all Creatures Male and Female, which diſtinction of Sexes cannot proceed from the *undirected* Motion of Matter.

And notwithſtanding that the ſuperior Orders of *Creatures* have this Law in common with their *Natures*, yet it is the peculiar Perfection, and diſtinguiſhing Property of this *Order*, and theſe little *Animals* keep it without the leaſt Violation.

1. We obſerve ~~here~~ how even the *crawling Worms*, that have neither Eyes nor Ears, yet they, as well as the ſuperior Orders of *Creatures*, at certain Seaſons, have a natural Appetite to *Engender*, and to *Propagate* their kind by *Univocal Generation*; for notwithſtanding theſe inferior Orders of *Animals* are produced Spontaneouſly, by an *Equivocal Generation*, from Seminal Principles, latent in Matter, yet being produced, they have *Seed in themſelves*; and, according to the *Moſaick Philoſophy*, propagate according to the *Eſtabliſhed Courſe* of *Nature*.

2. As all *Creatures* have their *Beings* from *God*, ſo in *Nature's* Store-houſe he hath provided *Food* ſufficient for them; and by their Natural Inſtinct, they know both when and where to ſeek it; and they have alſo by Nature a craving *Appetite*, which puts them always upon buſy Queſt after it. Thus, as the Pſalmiſt obſerves, *The Eyes of all Things wait upon God, and he gives them their Meat in due Seaſon.*

3. All *Creatures* of the ſame Species *conſociate*, and are of themſelves a diſtinct *Corporation*, and are governed by their own Laws.

4. As God made all *Creatures* to be proportionably *Happy*, according to their Rank and Order; ſo they have all their ſeveral ways of *Pleaſure* and *Diverſion*, ſome by

dancing *around* in the open Air, to their own humming Muſick; others by ſinging, or whiſtling out their chearful Notes, anſwering one another by turns.

5. By *Natural Inſtinct*, they all avoid ſuch *Objects* as they fear danger from; and thoſe that have Natural *Armour*, make uſe of it in their own defence; and thoſe that are naked, *retreat* to ſuch ſafe Holds as *Nature* hath provided for them.

Once ſeeing a *Hawk* in hot purſuit after a ſmall *Bird*, the poor *Bird*, rather than fall into the Power of its Natural Enemy, did fly into my Lap for *Refuge*.

6. Thoſe that are *Winter-Sleepers*, when the Summer warmth abates, and their Feeding fails them, they draw to ſuch Winter-Quarters as *Nature* hath provided for them, and are ſuitable to their *Natures*; and as ſoon as the approaching Sun, next Spring, awakes them, they march out into the Fields to *Propagate* their kind.

Riding over the *Mountains* one warm Spring-Morning, I ſaw infinite Numbers of *Frogs* coming out of their Winter-Quarters, which was a vaſt heap of looſe *Stones*. The *Females* were ſo over-burthened with their Bellies full of Spawn, that the *Male* Frogs bore them on their Backs; and in this Poſture they croſs'd my way in ſuch Numbers, that my Horſe trod ſeveral of them to death. Their march was into the next *Marſh.*

7. Among the creeping *Inſects*, the little *Ant* is the moſt remarkable, being the moſt regular in its Government, as well as provident and forecaſting for *Winter-Proviſions*; of theſe there are ſeveral ſorts, (*viz.*) the *Field-Ant*, and the *Wood-Ant*. The *Field-Ant* feeds upon ſmall Seeds; and that they may not ſprout in their *Store-houſe*, they eat off that end wherein *Nature* hath placed the ſpecifick *Form.*

Theſe have their *Governours* and *Leaders*, which they follow along their little *Paths*, in exact Order, and return the ſame way; they all go out light, but all return home heavy loaden with their Burthens upon their Backs.

The *Wood-Ant* feeds upon *Leaves*; and in the *Weſt-Indies*, you may ſee (as *Dampier* relates) great Paths made by them, three or four Inches broad, and as beaten as the High-ways. You may ſee them with Burthens of green *Leaves* upon their Backs, ſo big that one can ſcarce ſee the *Inſect* for the Burthen, and yet they march ſtoutly. It's a pretty ſight to ſee theſe *Regular Troops* marching in ſuch Order, that the *Path* looks perfectly green with them.

Theſe *Ants* are *Intermedials*, between *Creepers* and *Flyers*; in *June* and *July*, they take Wing, and their Diverſion is to fly abroad in the open Air in great Swarms; eſpecially when the warm *Sun* invites them out, to take their Pleaſure after their Fatigue of Labour is over.

The next remarkable *Inſect* is the *Honey-Bee*, which has exerciſed the Heads as well as the Pens of many learned Men. *Ariſtotle*, in the Firſt Book of his Natural Hiſtory, numbers *Bees* among Ζῶα πολιτικὰ, *Civil People.* For the Uſe of Life, ſaith *Pliny*, they Labour, Work, and Ordain a Common-Wealth; have their private *Councils*, their warlike *Actions*, and which is ſtrangeſt of all, they have their *Morals.*

They have their *Maſter-Bee*, which aſſigns Tasks for the whole *Swarm*; ſome gather *Thyme*, and bring it home upon their *Thighs*, of which they make their Combs; others bring home *Honey* in their Bellies, which they ſuck out of the Honey-Flowers, as the *Honey-Suckle*, *Lamb-Suckle*, the *Clover Flowers*, but more eſpecially in *June*, *July*, and the beginning of *Auguſt*, when the Honey-Dews fall upon the Leaves of the *Oak*, the *Aſh*, the *Palm-Tree*, &c. and likewiſe upon *Graſs* and *Flowers*; this they ſuck up, and fill their little Cells with Honey, and then do ſo wax it up, that it may not melt and run out.

This Year I obſerved ſeveral *Honey-Falls* in *July*, and the beginning of *Auguſt*, when the *Ling*, *Heath* and *Furz* were in their full *Bloſſom*; it was moſt diſcernable upon the ſmooth Leaves of *Trees*. One might have ſeen it bright and ſhining.

They might have taſted it with their *Tongues*, and felt it with their *Fingers*, to be Unctuous and Clammy: When theſe *Honey-Dews* fall, the Air is always Calm, Hot, and Sulphury. It fell this Year ſo thick, that it ſometimes roaped down from the *Leaf* like ſmall *Threads*. It ſeems to be of the Nature of that *Manna* which fell in the Wilderneſs. *Pliny* conceits theſe *Honey-Falls* to be the Sweat of *Heaven*, or the Spittle of the *Stars*, or the Moiſture of the *Air*, purging it ſelf; but theſe Conceits may be reckoned among the Miſtakes of that great Naturaliſt; theſe *Honey-Falls* being only the *Effluvia* of ſweet Flowers, and the Bloſſoms of Ling and Heath, *&c.* extracted by the Summer-Sun; and when contracted and digeſted in the warm *Air*, it falls down in a Shower of *Honey-Dew*, upon the *Graſs*, *Trees*, &c.

It is at theſe times, that the *Bees* gather moſt of their *Honey*, and fill their *Combs*.

The *Drones*, which are reproached as an *Emblem* of Idleneſs, have their *Task* allotted them; for when, in the *Wars*, they have *loſt* their *Stings*, that they cannot work, they are kept in the Hives at home for breeding; and when their young Brood is ready for Swarming, they come down from their Cells, fly *abroad*, and do not only give Notice to the *Bee-Maſter* to provide *Quarters* for them, but Seek about for a convenient place to light on, or incamp in.

Bees ſwarm twice or oftener in the warm Months of *Summer*; and the *Drones*, being come down, the *Maſter-Bees*, which are ſuppoſed to be *Male* and *Female*, give notice to the *Bee-Maſter* the *ſecond time*, to provide new *Quarters* for a ſecond Swarm: And this they do by their Tones, (*Out*, *Out*) the *Male* Tone is *Baſe*, and the *Female*, *Trebble*; and they call (*Out*, *Out*) by turns.

The *Maſter-Bees*, which are bigger and differ both in *Shape* and *Colour* from the reſt of the labouring *Bees*, have their diſtinct *Apartments*; which are much larger than the reſt of the *Cells*; and theſe are commonly in the middle of the *Comb*. Theſe *Maſter-Bees* come out with the Swarm, and whereever they light, their Swarm incamps about them.

When Foreign *Enemies* endeavour to invade their *Kingdom*, they fight for their

Prince; not with their *Stings*, but their *Teeth*, and they know in what part the *Enemy's Armour* is the weakeſt; which is under the Wing, and there they give the deadly *Bite*; and then two or three join their ſtrength, and draw the Corps out of their Quarters.

Sometimes they have *Civil* Wars at home, which oftentimes prove very fatal, and the ruin of their Monarchy.

This being a Subject much Treated on by Men of great Learning, I ſhall Subjoin no more upon it, but proceed to give ſome Inſtances of the wonderful Power of Natural Inſtinct in Birds; which are alſo *Oviparous Creatures*, but of a higher degree of Perfection in *Nature's Scale of Life*.

1. And firſt, we may obſerve with what Care, Induſtry, and Contrivance the little *Birds* do build their *Neſts*, agreeable to their Strength, and proportionable to their *Bodies*: every *Species*, having its own way of building, and never vary from it.

2. With what Patience do they *Sit* their *Eggs*; and with what *Care*, *Patience* and *Affection* does the *Cock* or *Male* attend the *Hen* or *Female*, during that Time of Sitting, bringing in to her Food and Nouriſhment; and that ſhe (ſometimes) may take her *Diverſion* in the open Air, relieves her by Sitting upon the *Eggs his turn about?*

3. How do theſe little *Creatures* expoſe their Lives to danger, rather than be robb'd of their young ones?

We obſerve that when the *Moor-Hen* finds her Neſt likely to be diſcovered, ſhe flies from it as if ſhe were broken back'd, and lame both of *Wing* and *Limb*, tempting her Enemies to purſue her in hopes to take her, 'till the Sight of her *Neſt* be loſt.

4. With what Patience and Attendance does the *Gander* attend his *Gooſe*, during the time of her *Sitting*; he gives her Notice when to come off her *Eggs* and take the Refreſhment of a little Water; he conducts her to it, and uſhers her back again to her *Neſt*; and for want of her Company, almoſt pines himſelf with Hunger and Attendance.

I once took Notice of a moſt wonderful Inſtance of *Jealouſy* and *Revenge*, in a poor *Gander*; one of the neighbouring *Ganders* committed a *Rape* upon his *Gooſe*, who by her *Out-cry*, gave him Notice of it (being but at a little diſtance;) he preſently took Wing and gave him ſo dreadful a ſhock, that made the guilty Criminal go off drooping.

5. We obſerve in *Turkies*, that aſſoon as ever they are well *Hatched*, and ſet forth into the *open Air*, if the *Dam* give Notice by a certain *Note* or *Tone* (which by their *Natural Inſtinct* they underſtand as we our Mother's Tongue) that the *Kite* or ſome other *Enemy*

is hovering over them, they preſently take ſhelter under her *Wings*, or fly to ſome Buſh for Sanctuary; and if the Surprize be ſudden, they then clap down cloſe to the Ground and lie as if they were *dead*, till the *Dam* by another *Tone* gives Notice that the *Enemy* is *drawn off*, and the danger is over.

6. As we have obſerved that thoſe weaker *Animals*, ſuch as the *Ant* and the *Bee*, which cannot bear the Winter *Cold*, lay in in *Summer Proviſion* for Cold *Winter*; ſo we obſerve, that the Birds who are of a ſtronger Body lay up no Proviſion for *Winter*, *Nature* having provided otherwiſe for them.

Birds build their *Neſts* either upon the *Earth* or in and about *Houſes*, or in *Trees*; the former live upon *Corn* or ſmall *Seeds*; but the latter that build in *Trees* feed upon the Fruits of Trees, as *Sloes*, *Choups*, *Acorns*, &c. and it is obſerved that theſe *Birds* are much fatter in *Winter* than in *Summer*, and the fatteſt in a *froſty Seaſon*.

All theſe ſorts of *Creatures*, by *Natural Inſtinct*, foreſee the *Changes* and *Alterations* of the *Weather* much ſooner than we; and they diſcover it to us dull *Animals* by their flying higher, or lower; or by their flocking *together*, or by their *Chirping Notes*; and one little Bird, after a long *drought*, gives Notice of the enſuing *Rain*, by her Note (*Wet, Wet,*) and it was for this Reaſon that the ancient *Augures* accounted them *Prophets.*

As the Wood-Birds feed upon the Fruits of Trees, which are their *Sanctuary* to reſt upon, and fly to, according to the Pſalmiſt; *The Trees of the Lord are full of Sap, even the Cedars of Lebanus, which he hath planted, wherein the Birds make their Neſt; and the Firr-Tree is a Dwelling for the Storke.* So the *Birds* are the *Natural Planters* of all ſorts of Wood and Trees; they diſſeminate the *Kernels* upon the *Earth*, which, like *Nurſeries*, brings them forth, 'till they grow up to their Natural Strength and Perfection. *Pſal.* 104.

About twenty five Years ago, coming from *Roſe-Caſtle*, early in the Morning, I obſerved a great Number of *Crows* very buſy at their Work, upon a declining Ground of a moſſy Surface; I went out of my way on purpoſe to view their Labour, and I found they were a planting a Grove of Oaks: The manner of their planting was thus, They firſt made little Holes in the Earth with their Bills, going about and about, 'till the Hole was deep enough, and then they drop'd in the Acorn, and covered it with Earth and Moſs: This young Plantation is now growing up to a thick *Grove* of *Oaks*, fit for uſe, and of height for the *Crows* to build their Neſts in. I told it to the Owner of the Ground, who obſerved them ſpring up, took care to ſecure their *Growth* and *Riſing*. The Seaſon was the latter end of *Autumn*, when all Seeds were full Ripe.

I might farther Enlarge this Claſs, by ſubjoining ſeveral more Inſtances of the Power of *Natural Inſtinct*, and how duly this Law of Nature is obſerv'd and kept by theſe *Inferior Orders* of *Creatures*; but theſe ſeem ſufficient to *reflect Shame* and *Reproach* upon *Humane Nature*; which being the higheſt Order, and the very Top of this *Viſible Creation*, yet is the only Creature (the Devils excepted) which is Irregular, Diſorderly, and violates the Law of its Creation.

OF

MAGNETISMS

AND

INFLUENCES.

THERE is no Theory or Speculation in Nature, that entertains thoſe Noble Faculties of Humane Reaſon and Underſtanding, with a more grateful and delightful Touch, than the Contemplation of that agreeable Harmony, which we obſerve to be in the whole Courſe of Nature; wherein every part conſpires to the Support of the Oeconomy and Frame of this Viſible Creation.

For if we look no higher than this Elementary World, we may obſerve, that if thoſe contrary and oppoſite Qualities of Heat and Cold, of Siccity and Humidity, ſhould break the Laws of Friendſhip, and act their Antipathies one upon another, this beautiful

Fabrick would preſently be diſſolved into its originary Chaotick Condition.

Again, if we look up higher, we may viſibly obſerve how the heavenly Bodies ſhed forth their Celeſtial Influences upon this Earth, and the ſeveral Ranks of Creatures that live upon it.

Moſes tells us, That *God* made the *Sun* to rule the Day, and the *Moon* to rule the Night, which is not to be underſtood only of their different Illuminations, by which they diſtinguiſh Day and Night, but of their Influences upon *Life* and *Matter*, which (according to the *Egyptian* Mythology) were ſymbolized by *Day* and *Night*. How does the approaching *Sun*, in the Spring-Seaſon, by its Magnetick Influence, exert the Seminal Principles of all Vegetables, draw up their Juices, and ripen their Fruits?

How does the *Marrygold* gradually open her Leaves as the *Sun* riſeth higher; and when it's advanced to the *Meridian*, its Leaves are full ſpread; ſo that by the opening of that Flower, one may know when it is high Noon, as well as by the Index of a Dial; and as the *Sun* gradually deſcends, that Flower draws together its Leaves, and at Night is cloſed up?

How wonderfully does the *Heliotrope*, or Sun-Flower, follow the Motion of the *Sun* in its Diurnal Courſe?

I ſhall only further inſtance in thoſe groveling Plants, ſuch as the *Hop*, the *Vine*, and *Ivy*; to all which, God hath given ſmall Tendrils, or pliant Strings, fit to graſp about a Supporter; and theſe, as if they were ſenſible of being Adjective, are always in buſy Queſt for their Subſtantive; and when they have found their Supporter, they claſp about it, and climb up to the top; and in their Windings, always follow the Motion of the *Sun*; and they will rather break than change their Courſe, ſo ſtrong and powerful is the *Sun*'s Magnetiſm and Influence, not only upon theſe groveling Plants, but alſo upon the *Life*, both of Men and Beaſts.

As the *Sun* thus rules the *Life* of Animals, ſo the *Moon* governs their Bodies, for every Country-Man will go to his Almanack, to know by the Increaſe or Decreaſe of the *Moon*, when it is proper to let Blood, or ſow his Gardens; but the *Moon* being a Humid Body, its Influence is more Viſible upon Aquatick Plants, and ſuch Animals as have Humidity predominant in their

That the Moon is a Humid Body, will be apparent, if you take ſuch a Glaſs as we commonly make uſe of to Contract the Sun Beams into ſuch a Point as will be real Fire, that you may kindle your Pipe with it: If you take the ſame Glaſs when the Moon is at the Full, you may with it Contract the Beams of the Moon into a wateriſh Dew upon your Handkerchief; ſo that if you pleaſe, you may waſh your Face with Moon-ſhine.

Compoſition. And more eſpecially upon the *Sea*, as we have already obſerved, to which I refer.

As the *Sun* and *Moon* have a more Viſible Influence upon this Earth, Waters and Humid Bodies; ſo the other *Stars* are not wanting to contribute their Inviſible Influences towards the Support of Viſible Nature.

But that I may not over-burthen my Reader, I ſhall only inſtance in that Magnetiſm we obſerve to be between the Polar Stars and this Earth; and if, in order to this Diſcovery, I take leave to aſſert, That this Globe of Earth and Water, whereon we live, is the Center, (at leaſt of the Planetary World) and that the Polar Stars are the Terminations of the Axis, about which the Planets and erratick Stars, have their Circumrotations, according to the different Extents of their Orbits, I preſume that my Opinion will neither be judged ſingular nor dogmatical.

I know that *Copernicus* and *Deſcartes* have eſtabliſhed a new *Hypotheſis*, (*viz.*) That the Sun is the Center, and that this Earth has an Annual Motion about it; which *Hypotheſis* (with Submiſſion) I look upon to be viſibly falſe and ridiculous; for the Polar Stars having no Orbit, but being fix'd, and never moving, unleſs about their own Centers, we ſhould, in our Motion about the Sun once every Year, leave behind our Backs the Northern Pole and Conſtellations, and (without the help of Navigation) go into the other Hemiſphere, where we ſhall come to the ſight of the Southern Pole, and thoſe Stars which the Interpoſition of the Earth keeps out of our ſight.

But it is not my Intention to turn Aſtrologer, or to quarrel with Hypotheſes, but to ſhew that this Earth, and the Polar Stars, being fixed upon the ſame Axis (vulgarly ſpeaking) it ſeems reaſonable to ſuppoſe, that there is a Line of Communication between the Polar Stars and this Earth. And this ſeems to be not only probable, but evident, from the Magnetick Needle, which can never leave its trembling Poſture, 'till it fix upon the ſame Line that points to the Polar Stars; the *Magnet* being, as it were, a *Terrella*, or the *Earth* in *Epitomy*.

The Magnetiſm between the Poles and this Earth, will be further apparent, if you take a ſmall Parcel of Virgin-Clay, digged ſome Fathoms under Ground, and make it into the form of a Rowling-Pin, and then hang it up with a ſmall Cord upon an even Balance, where there is no Wind to move it; and this Virgin-Earth ſo moulded, will not reſt 'till it point to the *Poles*; but after the ambient Air has entered its Pores it loſeth this Magnetick Virtue.

THE

Platonick Anima Mundi:

OR, THE

Chain of Life Illuſtrated.

HAving already made it apparently evident that *Matter* and *Life* are the Conſtituent Principles of all Compounded Bodies; and, that theſe two Principles were Concreated, and *Life* diffuſed through the whole Maſs of *Matter*; which two Principles by *Moſes* are Symbolically decyphered by *Heaven* and *Earth*, *Light* and *Darkneſs*, and their Sympathetical Unition by the *Evening* and *Morning*, I ſhall now proceed to Illuſtrate and give a little more Light into this dark *Phænomenon*. Gen. i. 1.

And firſt of all it muſt be acknowledg'd that the Notion of *Spiritual Forms* or naked Subſtances, is one of the niceſt and moſt abtruſe Points in all *Philoſophy*, which by

Vulgar Authority, is meanly handled; and by the Wiſeſt is known but by Conjecture. That our Notions therefore may be more perceptible and clear, we ſhall firſt think it neceſſary to give a Plain and Clear Definition of *Body* which is the ſame with *Matter*; and then we ſhall with more Facility and Eaſe come to underſtand the true Notion and Nature of *Form* or *Spirit*, my Intention being only to give Satisfaction to ſome Men who value themſelves for being *Scepticks* in every thing that is not ocularly viſible and tangible, and obvious to their External Senſes, and therefore look ſlightly upon the Notion of *Immaterial Subſtances* or *Spirits*, as if their Notion was a Piece of Nonſenſe and Incongruity.

I ſhall therefore comprehend the Notion and Nature of *Body* or *Matter* under this Definition.

The Definition of Body.

A *Body* is a Material Subſtance *Phyſically* extended of itſelf, altogether deſtitute of *Life* and *Motion*; Its chief Properties are *Impenetrability* and *Diviſibility*. And from the Law of Oppoſites, which is a true Logical Way of Reaſoning, we ſhall *define* a Spirit to be an Immaterial *Subſtance*, *Metaphyſically* extended, endued with *Life*, *Motion* and *Self-Activity*.

The Definition of Spirit.

Its Eſſential Properties are, 1. *Indiviſibility.* 2. *Penetrability.* 3. *Self-Activity.* And 4. *Contraction* and *Dilatation* in its own Circumſcribed Vehicle.

The Eſſential Properties of a Spirit.

I ſhall firſt explain ſuch Terms in the Definitions as to ſome may appear dark and leſs intelligible, and then Illuſtrate the Eſſential Property of both *Body* and *Spirit.*

By a *Phyſical* Extention I underſtand *Diviſibility*; for all Matter conſiſting of a Juxta-Poſition of Parts is capable of being divided into Atoms; and although thoſe *Minima Corporalia* for their extream Littleneſs be utterly ~~undiſcernable~~ indiscernible, as to our outward Senſe, yet they are Intellectually *Diviſible.*

Of Phyſical Extention.

2. *Deſtitute of Motion*; for notwithſtanding that one Part of Matter may move another, yet it muſt be by the Impulſe of an External Agent, Reſt being the Property of *Matter*, as Activity is the Property of a *Spirit.* *Impenetrable*; i. e. Bodies of the ſame Nature and Magnitude cannot occupy the ſame Circumſcribed Place at the ſame time; for the moſt minute Parvitude cannot lie ſo cloſe together but there will be Intervals; and therefore in the moſt denſe Matter there is *Locus in Loco,* which is ſuſceptive either of *Heat*, or *Cold*, or *thin Air*, there being no ſuch thing as a *Vacuum* in Nature.

All Matter is either fix'd, fluid *or* volatile; *without fluid Matter there would be no Motion, and without volatile Matter to implete the Intervals in Solids there would be a* Vacuum.

Having now made the Definition of a Body ſo clear, that any who does not wilfully lay aſide his Reaſon, may underſtand the Nature of *Matter*, and wherein the Notion of *Body* conſiſts, I proceed to explain the Nature and Property of a *Spirit* in general, but more eſpecially of the Humane *Soul.*

The firſt property of a Spirit is indiviſibility.

1. I define a Spirit to be an Immaterial Subſtance, Metaphyſically *extended*: By a Metaphyſical *Extenſion* I underſtand ſuch an *Extenſion* as is in its own Nature indiſcerpible and indiviſible, which is the Eſſential Property of a *Spirit*, this Notion of *Metaphyſical Extenſion* baffled *Lucretius*, and our Country-man, Mr. *Hobbs*: I ſhall therefore Illuſtrate it by this eaſie *Example*: Suppoſe that a ſmall Beam of the *Sun* ſhould be, by a ſmall Loop-hole, let into a large Room; this Ray of Light is viſibly extended; but it's impoſſible for the cunningeſt Artiſt to clip it into Shreds or Parts; he may by ſtopping the Hole exclude the *Beam*, and thereby reduplicate it, as the reflections of the *Sun* are againſt a Wall.

This *Notion* enervates the ſtrongeſt Argument *Lucretius* has urg'd for the *Diviſibility*, and conſequently for the *Mortality* of the Humane *Soul.*

For if the *Soul* be *diviſible*, then (as he argues) by cutting off a Leg or Arm, we cut off a part from the *Soul*, and ſo may divide it into Shreds.

He further argues, That if that chiming Maxim of *Ariſtotle* (viz.) that the Soul is *tota in toto & tota in qualibet parte*, be true, then, by cutting off a *Finger* or a *Toe*, we may by chance cut off the Soul, and divide it from the whole Body, if at that time it was the Soul's ill fortune to be in that part.

Theſe Difficulties are cleared by the *Example* of the *Sun-Beams*, which tho' they cannot be divided into parts, yet, by ſtopping of the Inlet, they may be repulſed and reduplicated: So when a Leg or Arm are cut off from the Body, there is no part of the Soul cut off, but that Ray of *Life* which animated that Member, by cutting the Nerves, and ſo ſtopping the Extenſion of the Ray, it returns to the Center of the Soul; and reduplicates in the other parts of the Body; and thus we frequently obſerve, that thoſe that are born blind, have prodigious Memories, the Defect in one Faculty, being doubled in another.

As the *Sun* is placed in the middle of the *Planets*, and emits from its *Center* Homogeneous *Rays* of Light to the Extremities of its Circumference, ſo the Humane *Soul* hath its *Ubi* in the *Body*, and from its *Center*, extends Homogeneous and Contiguous *Rays* of Life to the extream parts of its *Vehicle*. For Example, place one end of a Staff upon the *Toe*, and with your *Finger* make an Impreſſion upon the upper end of it; and that Impreſſed *Motion* will in the ſame Moment of Time be felt upon the *Toe*: In like manner, when an external *Object* has made an Impreſſion upon the *Center* of the *Soul*, it commands a Motion upon the *Toe* or *Finger*, or any other part, as quick as thought: This we obſerve in our Fingers, running Diviſions upon a Muſical Inſtrument.

This may convince the *Nullibiſt*, that the *Soul* hath its *Ubi* circumſcrib'd in its proper *Vehicle*, for where-ever the *Operation* is, there is the *Operator*; and when he ſtumbled upon this Thought, that the *Ubi* of a *Spirit* was *Nullibi*; his Soul was either in his Body, or with his Wits was gone a Wool-gathering.

Self-Activity. A Second property of a *Spirit* is Self-Activity, by which it actuates Matter, and determines its Motions according to the Property of its own Nature.

Penetrability A Third Property of a Spirit is *Penetrability*; and this is ſo clear and obvious, that it need no Illuſtration; for if *Heat* and *Cold*, which are only Material *Spirits*, can pervade the ſtraiteſt Pores of the denſeſt

eſt Matter, with much more Facility can an *Immaterial Spirit* penetrate the moſt ſolid Body, leaving no Foot-ſteps behind.

A Fourth Property is *Contraction* and *Dilatation*; and this is demonſtratively apparent by the Light of a Candle, which may either be contracted within the Walls of a Dark-Lanthorn, or dilated to the extremity of its Sphere.

Contraction and dilatation Illuſtrated.

Having now illuſtrated and made intelligible the ſeveral Terms in the Definition; I proceed to illuſtrate the ſeveral Orders and Degrees of Spirits, and ſhew how they are diſtinguiſh'd.

The firſt and loweſt Order of *Forms* are thoſe we call the *Mineral Spirits*, which being diffuſed through the whole *Body* of the *Earth*, give Generation, Growth and Perfection to all Mines, Minerals, Stones, and Earths; for what is it that glews and cements together all the Rocks, Stones, and Solids of the Earth, and keeps them at reſt in their Natural Beds, but this Mineral *Spirit*?

The firſt order of Spirits.

The Second order is the Seminal *Forms*, whoſe diſtinguiſhing *Faculty* is to organize Matter duly prepared and modify'd into the Life of *Vegetation*, proper to this or the other kinds of Plant, Tree, &c. and then by Suction and Filtration, to aſſimulate ſuch Juices as are agreeable to their

Seminal Forms the ſecond elevation of Life.

their Natures into their own Subſtance; the *former* was an under-ground *Spirit*; and this *Spirit* of *Vegetation* hath only its Head in the Earth, and its Body and Branches upwards.

Senſation the Third Elevation of Life.

The Third Elevation of *Life*, is *Senſation*, which is the Eſſential Perfection of a *Beaſt*; and now Life is got free from the Fetters of the *Earth*, and is at liberty to go about and make choice of ſuch Nouriſhment as is moſt agreeable to its Nature; yet all of this Order have their Heads downwards.

The Fourth Elevation of Life.

The Fourth Elevation of *Life* is *Rationality*, which being added to the Perfections of *Vegetation* and *Senſation*, makes a *Man*; which being the only Creature upon this Earth capable of *Contemplation*, hath his Head upwards towards Heaven.

The Fifth Elevation of Life.

The Fifth Elevation of Life is *Intelligence*, which being added to Senſation and Rationality, advanceth Life to that higheſt Order of Created *Beings* we call *Angels*. And theſe actuating *Vehicles*, either of thin *Air* or pure *Æther*, have no dependance upon this *Earth*, for that all ſpiritual *Entities* have their *Vehicles*, is not only a *Platonick* Hypotheſis, but the expreſs Doctrine of St. *Paul*, who tells us, that there are *Bodies Celeſtial*, and *Bodies Terreſtrial*, and that in the Reſurrection our Bodies ſhall be ſpiritualized and made fit to correſpond with our Souls in all its Motions and Activities.

As there is then *Mundus Materiæ*, which we may properly call the great *Body* of the viſible World; ſo there is *Anima Mundi*, which is the great *Soul* of the Univerſe, that by its *Plaſtick* and *Vivifick* Powers, Actuates, Informs, and Enlivens this great Body; but this great *Soul* being to us Inviſible, and conſequently leſs perceptible to our underſtandings, we ſhall Illuſtrate it by this plain and familiar Example.

Suppoſe a Candle placed in the middle of a large *Room*, of a round and circular Form or Figure, the Candle itſelf is the Center of *Heat* and Light; the Circles neareſt the Center participate moſt of its Heat and Illumination, but towards the Outſides and Circumfernce of the *Room*, the Rays of Light are only Weak and Glimmering: In like manner the Center of Life, and Light is the *Divine Eſſence*, which *Plato*'s Divinity calls the *Triune God*: The neareſt Circles are the Intellectual *Beings*, next to them are the *Rational*, next to which are the *Senſitives*, and the weakeſt Glimmerings, and ſmalleſt Sparks give Life and Motion to thoſe little *Animals*, we call Inſects.

Such APHORISMS, DEFINITIONS, *and* AXIOMS, *as we have made uſe of in this Treatiſe.*

Of Nature.

NATURE's Productions are never in vain.

Nature's Productions are not by blind Chance.

Nature never works in haſte.

Nature's Productions are not by precipitous Leaps, but by gradual Motions.

Nature never does that by Much, that may be done by Leſs.

Of Matter and Life.

Life is a Chain, and the beſt Method to come to the knowledge of a Supream Being, is to aſcend upwards, from the loweſt Link to the top of the Chain.

The ſeveral Species of Life are concatenated by Intermedials. Matter and Life are Contemporaries.

Life is diffuſed through the whole Maſs of Matter.

Matter is the ſame, and though it undergo a Thouſand Tranſmutations, no Particle is loſt.

Of Animals.

Every Element hath its Animal, and every Animal a Nature agreeable with its Element.

Every Animal is perfect in its own Claſs or Order.

The more deformed Animals ſet off the Beauty of the more comely.

Of Heat and Cold.

Heat and Cold are the two Hands of Nature.

What Heat hardens, Cold diſſolves; and what Cold hardens, Heat diſſolves.

Of the Elements.

There are but two Elements, (*viz.*) Earth and Water, their Eſſential Qualities are Siccity and Humidity.

The Air is only Water rarified.

Fire is only a violent Agitation of dry Particles.

Siccity contracts Poiſon, and Humidity expels it.

Of the Univerſe.

The whole Univerſe is fix'd and floating; every Thing is at reſt upon its Center, and every Center is floating about its Orbit.

Upward and downward, are only *quoad nos*, and are only imaginary Terms.

Eaſt and Weſt are Imaginary.

All the heavenly Globes have their Motion from Weſt to Eaſt. The appearance of Motion from Eaſt to Weſt, is *Deceptio Viſus*.

Of Motion.

All Motion is either Natural, Mix'd, or Violent.

No Motion is Natural, but the Circular.

The Motion upward and downward, is Central and Mix'd.

All Collateral Motions are Violent.

Lay a Globe Mathematically *Round*, upon a Mathematical *Plain*, and its Motion will be perpetual.

THE
CONCLUSION.

IF what I have advanced upon the Contemplation of the *Viſible* and *Inviſible* Creation will not convince an *Atheiſt*, that there is a God that created the Heavens and the Earth, I know of no better Expedient than that God would e'en turn him out to Graſs with *Nebuchadnezzar*, and feed him with the Bread of Affliction, 'till, with that great *Man*, he acknowledge, *That of a Truth there is a God in Heaven*, that is the Rector and Governour of the Univerſe.

Or elſe, that God would give him Liberty, with the *Prodigal Son*, to go into ſome far Country, and there feed his ſwiniſh *Luſts* with the empty Husks of ſinful Pleaſures, 'till he find, by Experience, that he cannot fill his Belly with them: For it is as morally impoſſible for an Immaterial Soul to be ſatisfy'd with the Pleaſures of *Senſe*, or the Enjoyments of a Material *World*, as it is for a craving Appetite to be ſatisfy'd with a Table a Table furniſh'd with painted Meat; this may bring him to his right Underſtanding, for it was *fame pereo* that brought that graceleſs Youth to the Thoughts of *ibo ad patrem.*

Curtious Reader, Being called for in haſte from the Inſpection of the Preſs, I had not Time to Correct ſuch Litteral or Verbal Miſtakes as may be committed throughout theſe Sheets; I deſire therefore that they may neither leſſen the Eſteem of the Argument, nor the Author.

The Author being abſent, the PRINTER deſires the Reader to Correct theſe Miſtakes.

PAge 50. Line *ult.* for *leſſer*, read *cloſer*, p. 88. l. 1. f. *here*, r. *how*, p. 107. f. *undiſcernable*, r. *indiſcerpible*, p. 108. f. *indiſcernable*, r. *indiſcerpible*, p. 111. f. *organized*, r. *organize*.

FINIS.

Some BOOKS Printed for and Sold by W. Freeman, *at the* Bible *in* Fleet-ſtreet.

NEW *Obſervations* on the Natural Hiſtory of this World of Matter, and this World of Life; Being a Philoſophical Diſcourſe, grounded upon the *Moſaick Syſtem* of the *Creation* and the *Flood*; With ſome Thoughts concerning *Paradiſe*, the *Conflagration of the World*, a Treatiſe of *Meteorology*, and ſome Occaſional Remarks upon ſome late *Theories, Conferences and Eſſays. Price* 2 *s.* 6 *d.*

The *Anatomy of the Earth*, in 4to. *Price* 6 *d.* Theſe Two were written by *Tho. Robinſon*, Rector of *Ousby* in *Cumberland.*

The *Law* of *Nature* and *Nations:* Written Originally in Latin by *S. Puffendorf*, Councellor of State to the late King of *Sweden.* Done into Engliſh by Mr. *Kennett.* In Folio. *Price* 1 *l.*

A Diſcourſe concerning the *Certainty* of a *Future* and *Immortal State.* In ſome Moral, Phyſiological and Religious Conſiderations. By a *Doctor of Phyſick. Price* 2 *s.* 6 *d.*

The *Compleat Horſeman*, or *Perfect Farrier*; In Two Parts. I. Diſcovering the ſureſt Marks of the Beauty, Goodneſs, and Imperfections of Horſes, the beſt Method of Breeding Colts, making their Mouths, Dieting and Ordering of Horſes. Part II. Contains the Signs and Cauſes of their Diſeaſes, and the beſt Method of Curing them. Written in *French* by the Sieur *de Sollyſel*, Querry to the preſent *French* King, and one of the Royal Academy of *Paris.* Abridg'd from the Folio into Engliſh, by Sir *William Hope*; with large Additions, and Directions to the Buyers and Sellers of Horſes, in 8*vo. Price* 5 *s.*

A *Compleat Guide* for *Juſtices of the Peace.* In Two Parts; Continued down to the End of the laſt Seſſions of *Parliament*, 1706. With large Additions and Improvements, and Two Orders of Seſſions, One for Limitting the Wages of ſeveral Artificers, Labourers, Servants, and Husbandmen; The other for Settling the Rates to be given to Carriers for Carriage of Goods, *&c.* never before Printed in any Book of this kind. By *J. W.* of the *Middle-Temple*, Barriſter. *Price* 6 *s.*

Syſtema Horticulturæ; Or the *Art of Gardening:* In Three Books. Treating of the Excellency, Situation, Soil, Walks, *&c.* and other Ornaments of *Gardens*; With many Rules and Directions concerning the ſame. Of Winter-Greens, Flowers, *&c.* of the Kitchen-Garden; With Inſtructions for making Hot-Beds, altering and enriching any ſort of Garden-Ground, *&c.* to a very great Improvement of every ſort of Land for Uſe and Profit, Ornament and Delight. Illuſtrated with Sculptures. The Fourth Edition: By *J. Worlidge*, Gent. *Price* 2 *s.* 6 *d.*

The *Devout Communicant* Exemplified in his Behaviour, Before, At, and After the Sacrament of the Lord's Supper; Practically ſuited ro all the Parts of that ſolemn Ordinance. The Ninth Edition. *Price* 1 *s.* 6 *d.*

The *Whole Duty* of a *Chriſtian:* Containing all things neceſſary, both as to what He is to Know and Do for obtaining a Happy Eternity. *Price* 1 *s.* 6 *d.*

An *Infallible Way to Contentment*; In Two Parts Compleat. *Price* 2 *s.*

An *Expoſition of the Church-Catechiſm*, with Scripture-Proofs in Words at Length. The Second Edition. *Price* 1 *s.* 6 *d.*

The *Church of England's Communicant*, Directed and Aſſiſted by the Publick Liturgy, in 24°. *Price* 6 *d.*

The *Terrible Stormy Wind* and *Tempeſt*, which hapned *Nov.* 27. 1703. Conſider'd, and ought *to be had in Everlaſting Remembrance*; To which is added *Fair Warning* to a *Careleſs World. Price* 6 *d.* Theſe Six were all Written by the Author of the *Devout Communicant.*

Theſaurarium Mathematicæ: or the Treaſury of the Mathematicks. Containing Variety of uſeful Practices in *Arithmetick*, *Geometry*, *Trigonometry*, *Aſtronomy*, *Geography*, *Navigation* and *Surveying*. As alſo the Menſuration of *Board*, *Glaſs*, *Tiling*, *Paving*, *Timber*, *Stone* and *Irregular Solids.* Likewiſe it teacheth the Art of *Gauging*, *Dialling*, *Fortification*, *Military-Orders* and *Gunnery*: Explains the *Logarithms*, *Sines*, *Tangents*, and *Secants*: Sheweth their uſe in *Arithmetick*, &c. To which is annex'd a Table of 10000 *Logarithms*, *Log-Sines* and *Log-Tangents.* Illuſtrated with ſeveral *Mathematical Sculptures* on Copper-Plates. Originally Compos'd by *J. Taylor*, Gent. And now carefully Revis'd and Corrected. To which is added, The Uſe and Practice of ſeveral *Propoſitions* and *Problems* throughout the whole Work, as alſo the Deſcription and Uſe of both *Globes*, and ſome of the chiefeſt *Mathematical Inſtruments* both for Sea and Land. With many other conſiderable Additions and Improvements. By *W. Alingham*, Teacher of the *Mathematicks.*

There is juſt now done a neat Impreſſion of *Quarles*'s Emblems, the Plates being new cut, and the Book printed on very good Paper. *Price* 5 *s.*